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TESTING AND OPERATIONAL REQUIREMENTS FOR THE B–2 BOMBER

HEARING

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

JULY 21, 1989

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TESTING AND OPERATIONAL REQUIREMENTS FOR THE B-2 BOMBER

FRIDAY, JULY 21, 1989

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

The committee met, pursuant to notice, at 9:40 a.m., in room SR-325, Russell Senate Office Building, Senator J. James Exon presiding.

Committee members present: Senators Nunn (chairman of the committee), Exon, Levin, Kennedy, Dixon, Glenn, Wirth, Warner, Thurmond, Cohen, and Wallop.

Committee staff members present: Arnold L. Punaro, staff director; Christine C. Dauth, chief clerk; Marie Fabrizio Dickinson, assistant chief clerk.

Professional staff members present: Robert G. Bell, Richard E. Combs, Jr., William E. Hoehn, Jr., David S. Lyles, and Michael J. McCord.

Minority staff members present: Patrick A. Tucker, minority staff director and counsel; Romie L. Brownlee, deputy staff director for the minority; Brian D. Dailey, Jonathan L. Etherton, Ronald P. Kelly, George W. Lauffer, John E. Mansfield, and Durwood W. Ringo, Jr., professional staff members.

Staff assistants presents: Lori M. Jackson, Kelli J. Pronovost and Mickie Jan Wise.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Milton D. Beach, assistant to Senator Glenn; Jefferson B. Seabright, assistant to Senator Wirth; Terrence M. Lynch, assistant to Senator Shelby; James M. Bodner, assistant to Senator Cohen; Dudley L. Carlson, assistant to Senator Wilson; Anthony H. Cordesman, assistant to Senator McCain; Jack D. Crouch II, assistant to Senator Wallop; Robert M. Soofer, assistant to Senator Gorton; Charles G. Pearcy, assistant to Senator Lott; and Eric H. Thoemmes, assistant to Senator Coats.

Also present from the Department of Defense: Jack Welch, Assistant Secretary of the Air Force for Acquisition.

OPENING STATEMENT OF SENATOR J. JAMES EXON, PRESIDING

Senator EXON. The committee will please come to order.

The committee meets today to receive additional testimony on the B-2 bomber program, on the operational requirements for the B-2 both under a START Treaty and without arms control, on the

planned flight test activities, and on the results of the B–2's initial test flight.

We have here this morning the test pilots that we heard from earlier in a breakfast meeting.

It is no secret that I support the B–2 program, so I am particularly pleased that the first flight seems to have been a flawless performance. But working with all concerned, we did reduce the program by $300 million in the Strategic Subcommittee markup, and also the markup approved by the full committee.

The fences that we have put in place I think best demonstrate that the subcommittee and the full committee recognize the promise of the B–2, but also the need to be cautious. We certainly want to be cooperative. We believe that the mark that we came up with is pretty much the bottom line with regard to keeping the program going on a reasonable level, and that nickeling and diming the cuts further might impair the procurement on this aircraft—if it does indeed pass those fences that we have put in place.

I continue to believe that a strong case can be made for the B–2 program. But it is clear that many in the public, the media, and Congress are not persuaded by the merits of the program.

I hope today's testimony will highlight the extent to which our reliance on bombers for deterrence is increasing. This is especially true under a START agreement.

As I understand it, under START, the number of targets that we would have to hold at risk declines only very slightly, far less than the reductions in missile RVs that we would have to give up.

The weapons shortfall must be made up largely by our future bomber force. There is a big difference in the counting rules between penetrating bombers, like the B–2, and bombers carrying cruise missiles. Stated simply, there are significant advantages in having manned bombers. These are some of the issues that I hope our witnesses will cover today.

We have an extremely distinguished panel of witnesses here. First we have Gen. Larry Welch, the Chief of Staff for the Air Force. General Welch is joined today at the table by Gen. Jack Chain, the Commander-in-Chief of the Strategic Air Command. Welcome to you, gentlemen.

In addition, flanked on each side of those gentlemen are Col. Rick Couch of the Air Force, and Bruce Hinds, the test pilot for the Northrop Corp.

Welcome to you, gentlemen. We look forward to your testimony and hope you can shed some light on the START issues and on the need, from your perspective, for the B–2.

Also joining us today are the test pilots. They are here not to answer policy questions of the committee, but they are here to answer any questions that any member of the panel might have with regard to the performance of the aircraft during its first test flight.

Gentlemen, we particularly want to welcome you to this hearing. I suspect that the test pilots are in a position to give us some information that I think many members of this committee would very much like to have, and that certainly the public and the rest of the Congress is entitled to have.

As you know, there have been a lot of concerns raised about whether this radical aircraft design would fly, or just boomerang into the ground. Even some of the members of the committee have expressed grave reservations about the flying and handling characteristics of this aircraft. So we look forward to the testimony today of the test pilots in answer to any questions.

I just hope that you will be able to talk to those of us who do not understand all of the buzz words that are usually used by you people who fly airplanes, because there are those of us who are not familiar with all of the technical detail and jargon that is customarily used by you in the profession. So please talk on a level that we all can understand.

In just a moment I will proceed to recognize the witnesses. We will start with General Welch and then will proceed hearing from the witnesses in any fashion as he sees fit. But first, I would like to ask if there are any opening statements by other members of the committee. Also, at this time, I would like to insert for the record, a statement of Senator Dixon.

[The prepared statement of Senator Dixon follows:]

STATEMENT OF SENATOR ALAN J. DIXON

B-2 ADVANCED TECHNOLOGY BOMBER

Mr. Chairman, I am pleased to welcome our distinguished guests from the Air Force that are here with us today. I look forward to the presentation they have prepared on the B-2 advanced technology bomber. This hearing will provide the opportunity for the Air Force to explain how the B-2 best serves the needs of our strategic forces. In addition, this Senator looks forward to having a better understanding of the high cost and complexity of the program.

I am anxious to have the Air Force explain the strategic role of the B-2, and the current and future need of this type of aircraft. I am also anxious to understand why so much of the program has been called into question. The total cost of the program is enormous—members in this committee, other members, and taxpayers across the Nation question the validity of supporting such an expensive program, especially during a time when other programs which provide unique capabilities have been canceled.

From what was reported, the maiden flight of the B-2 was successful. However, there is no guarantee that the B-2 will pass all of the flight tests so successfully. The language adopted for the funding of the B-2 placed conditions on the obligation of procurement funds, which stemmed directly from this committee's concern of fully funding a program prior to proof that all program requirements have been met.

It is my hope that the Air Force briefing today will answer the many questions this committee has asked during the markup of the Department of Defense authorization for fiscal year 1990. Next week we will consider this authorization on the floor of the Senate. Large amounts of money have been spent already on this program. I want to be sure that the money already spent, and the monies to be authorized, will best serve the interests of the American people.

I look forward to seeing the Air Force presentation, and hearing their insight on this program. This session will provide the committee the opportunity to best judge whether this is the right program, and whether or not we are doing it at the right time.

Thank you, Mr. Chairman.

Senator EXON. Senator Warner.

Senator WARNER. I have none.

Senator WALLOP. Mr. Chairman.

Senator EXON. Senator Wallop.

Senator WALLOP. I would just like by way of observation to quote my old colleague, now the Secretary of Defense, and support what he said.

There are literally only two major options open to the committee and to the Congress. One is to cancel this outright. One is to fully fund it. He and I both agree that canceling it outright is not a responsible move.

The worst thing it seems to me we could do is to continue to fund it in such a way that it falls later of an economic weight that is not relevant to its strategic capability and to its arms control posture.

We need to know now whether or not the country is going to move forward with it. It is not fair to the taxpayer to try, somehow or another, to "save a little money now" in a spending regime which later becomes absurd because of the consequences of the reductions at this point. It is my hope that somehow or another, as we look at this under the arms control regime, which has been established now with the Reykjavik counting rule, that we do not leave America bound to an arms control agreement without the capability to live under that agreement.

Timing is much of the essence. That is why I welcome your hearing this morning. We need to know whether or not we are going to have this capability before we are bound by a set of counting rules and bound by a set of agreements that this country has that we cannot live up to and provide for the security of the American people under.

So, there is not tomorrow to make these decisions, somewhere down the road. The decisions need to be made today and they need to be made responsibly. I think the public needs to know whether or not we are going to do this directly, forthrightly, and aboveboard, or whether we are just going to abandon it, because in the middle is the most irresponsible path that I think Congress could select. So I welcome the hearing.

Senator EXON. Thank you very much, Senator Wallop.

Senator WARNER. Mr. Chairman, I would ask to have the record reflect a statement by your ranking minority member, Mr. Strom Thurmond, who is unable to be here this morning.

Senator EXON. That will be made a part of the record, without objection.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT OF SENATOR STROM THURMOND

B-2 BOMBER OPERATIONAL REQUIREMENTS AND FLIGHT TEST PROGRAM

Mr. Chairman, I congratulate you on holding this historic hearing. The first flight of the B-2 is an important milestone in a very important program. I am proud of the support this committee has given to the B-2 program from the very beginning, and I hope, as we go to the floor with the Defense authorization bill, that this splendidly successful first flight will begin to demonstrate the unique capabilities of this airplane. The testimony of the two pilots, Colonel Couch and Mr. Hinds, should convince our colleagues that the plane can indeed fly and fly well.

But this is just the first hurdle. The committee is very concerned that the cost of the B-2 program will kill it. I realize that the B-2 is only 20 percent more than the B-1B in flyaway cost, I realize that it is cheaper per warhead than the MX, I realize that it costs a smaller fraction of the budget than the B-52 did, I realize that the MX and Small ICBM together are about as expensive as the B-2; but it still costs too much. We have got to know whether the American people will buy this bomber.

We need to be absolutely sure this bomber is ready for production and what the costs will be. That is why the committee included an elaborate set of "fences" in the authorization bill before any new money can be obligated.

I am glad that you asked General Welch and General Chain to testify this morning on the operational requirements for the manned penetrating bomber. I believe it is extremely important, when opponents of this program are questioning the role of the bomber in the strategic modernization program, to have on record a clear statement, as detailed as security will allow, of the importance of the penetrating bomber in strategic plans. It is important to settle this; we cannot hold up the procurement of the B-2 while we argue again whether the United States Air Force ought to have a bomber that can fly into the Soviet Union.

Mr. Chairman, the manned bomber programs are key parts of strategic modernization, as much as the ICBM programs are. I hope today we can bring public attention to how important the B-2 program is to our Nation.

Senator WARNER. Mr. Chairman, just to follow on what Senator Wallop said, you and I came to the Senate together 11 years ago. The two of us, together with others on the Strategic Subcommittee, have monitored this program and its costs for 11 years.

As I read some testimony by a Member of the House of Representatives the other day, a new fellow on the block over there on the House Armed Services Committee, that committee likewise, for a decade, has followed every step of this program. So we have a tremendous investment of time by the Senate committee and the House committee.

We knew these facts all along—you and I and other members who served on this committee. Now we are sharing them not only with our full membership of the Senate and the House, but with America.

So we really pronounce judgment on this program knowing those costs for a decade. To turn our backs now and to try to pull a reversal after three Presidents have worked on it I think would be just a tragic development in the history of our country.

Senator EXON. Thank you very much, Senator Warner.

With that, General Welch, we will turn to you for your statement, and would ask you to please proceed.

I would simply add to the remarks that I happen to feel that the B-2 has the promise, and I emphasize the word "promise" at this particular juncture, to be even more of a "peacekeeper" than the Peacekeeper itself.

General Welch.

STATEMENT OF GEN. LARRY D. WELCH, USAF, CHIEF OF STAFF, U.S. AIR FORCE

General WELCH. Thank you, Mr. Chairman. I appreciate the opportunity to contribute to a proper focus on the B-2 program and the issues.

As you mentioned, General Chain, in addition to being Commander-in-Chief of Strategic Air Command, is also the Director of the Joint Strategic Target Planning Staff, and, as such, he is responsible for the day-to-day work that applies our strategic nuclear forces to the deterrent task. With that role, he will provide, I think, a very clear perspective on what it requires to do that task and the role the B-2 plays in it.

You have already introduced our two test pilots, Mr. Hinds, from Northrop Corporation, and Colonel Couch, from the U.S. Air Force. I appreciate your emphasis on the fact that they are test pilots.

They are here to answer questions that you can expect a test pilot to answer.

The role of the test pilot is to be the critic of the airplane that he is evaluating. When the testing is completed, we will expect the test force to certify to us that we indeed have an airplane that will do for the next 25 or 30 years what we bought it to do.

They are not advocates, as you said. They are evaluators. They play a vital role in that vein.

Before we hear from General Chain and the test pilots, let me just make a couple of very brief opening comments about the need for the B–2 and also the issues that this committee faces. The central issue clearly is deterrence, that is, avoiding the terrible consequences of a strategic nuclear war.

This country has, for more than three decades, enjoyed high confidence deterrence because of a robust, resilient, and very effective triad of strategic nuclear weapons. We depend on the bomber leg of that triad for more than 40 percent of all of those deterrent weapons.

With a START agreement, we will depend on the bomber leg for more than 50 percent of all of those deterrent weapons. So this puts the importance of the bomber leg of the triad, I think, in the proper strategic nuclear deterrent perspective.

Senator Warner has mentioned that this country has invested more than a decade and some $23 billion to date in this program. We are now seeing the first fruits of that investment. The first airplane has entered the test program. We will see an accelerated delivery of the fruits of that investment.

The B–2 is clearly central to the continued, long-term viability of the bomber leg of the triad. If there were a satisfactory, lower cost alternative in these constrained budget times, the Department of Defense, having gone through lots of painful decisions, particularly in the past 5 years, and made lots of painful choices, would certainly have long since embraced that lower cost, satisfactory alternative.

The fact is, there is no alternative. There is no alternative to maintain the viability of the bomber leg of the triad, because without the B–2, we would, over time, not in 3 years, not in 5 years, but over time, lose the capability for the penetrating bomber to address the targets that it must address for effective strategic deterrence.

And, over a longer period of time, as we allowed the Soviets to concentrate on cruise missile carriers, we would eventually lose the effectiveness of cruise missile carriers.

If we decide to forego the opportunity on the B–2, we have started down that path. I think that is a path that we should thoroughly understand before we make a decision to start down that path.

We would be giving up what we all agree, at least both sides of the negotiating table on arms control negotiations agree, is the most stabilizing leg of the strategic triad. The fact that we do have that agreement, that it is the most stabilizing leg, is the reason why we have the special counting rules which favor manned penetrating bombers over other forms of strategic deterrence.

It is an escapable fact of life that, with or without arms control, high confidence deterrence will continue to demand that our forces cover a very wide range of targets in the Soviet Union. Even with-

out a START agreement, there is no satisfactory alternative to the B–2.

Unfortunately the hyperbole about the costs has tended to obscure the strategic value of the B–2. I call it "hyperbole" simply because it does just that. It obscures the real issue, which is the contribution of the B–2 to the strategic task of deterrence and its contribution to conventional operations.

The B–2 program is a very significant investment. It is an expensive program. However, we characteristically buy strategic systems in bunches. We characteristically make a very large up-front investment in the development and procurement of strategic systems, characteristically over a short period of time, and then we reap the benefits of that investment in deterrence for 25 or 30 years after we make that investment.

This is the case with the B–52. The newest one is 28 years old today, and it still contributes to deterrence. It is the case with the Minuteman system, which is 25 years old today and still contributes to deterrence.

By the way, we paid more in the high year for the Minuteman than we are asking for in the high year for the B–2. We are paying more in total for another strategic system than we are for the B–2. But in those cases we have clearly made the decision, and everyone understands that the strategic value of those systems far outweighs the cost. That is also the case with the B–2.

That is why I characterize as very unfortunate that the hyperbole over cost has obscured the basic issue, which is the contribution to deterrence.

As to affordability, I think the best measure of overall affordability is that we have made the hard choices in the Defense budget that funds the B–2. So it is not a question of whether or not we can make those hard choices. We have offered the Congress a budget that makes those choices.

Furthermore, the investment in procurement over the procurement period of the B–2 is a lower percent of the budget than we spent on the B–1 and about what we spent on the B–52 when that was not an issue.

The purpose of my remarks is not to make any pejorative comments about other kinds of spending. It is simply to try to put into perspective the strategic value and the cost of this very important weapon system.

I thank you, Mr. Chairman.

General Chain, who is charged with the daily personal and professional task and responsibility for the daily mission of deterrence will give you a presentation on his perspective.

General Chain.

Senator EXON. General Welch, thank you very much.

General Chain, the committee welcomes you here this morning. Please proceed.

STATEMENT OF GEN. JOHN T. CHAIN, JR., USAF, COMMANDER-IN-CHIEF, STRATEGIC AIR COMMAND

General CHAIN. Thank you, Mr. Chairman.

WHY THE B–2

THE CINC'S PERSPECTIVE

I hope you can read that chart, Mr. Chairman.

What I will give you is my perspective as Commander-in-Chief of the Strategic Air Command of why we need the B–2 and also I will wear my other hat as the Director of Strategic Planning for the United States.

WHAT I'LL TALK ABOUT

- MY RESPONSIBILITIES
- STRATEGIC TARGETING
- WHAT WE HAVE TO WORK WITH
- WHY PENETRATING BOMBERS
- WHY THE B–2
- HOW MANY DO WE NEED
- ARMS CONTROL IMPACT
- SO WHAT

These are the items I will cover with you this morning.

WHAT THE TARGETS ARE

- **HARD TARGETS**
  - **ICBM SILOS**
  - **COMMAND POSTS**
  - **MISSILE LAUNCH CONTROL FACILITIES**
- **SOFT OR AREA TARGETS**
  - **DEFENSIVE SYSTEMS**
  - **AIRFIELDS/SUB BASES**
  - **FACTORY COMPLEXES**
  - **COMMUNICATIONS**
  - **ECONOMIC**
- **MOBILE TARGETS**
  - **ICBMS**
  - **AIRCRAFT**
  - **SURFACE NAVIES**
  - **ARMIES OUT OF GARRISON**

To understand the reason for a B–2, you have to understand the reason we need a penetrating bomber, and to understand the reason we need a penetrating bomber, one needs to understand the target set that I am responsible to be able to go against.

Targets fall into different categories. I have categorized them in three groups here on this chart this morning. The first are hard targets. These are targets that the Soviets have found very valuable to them, and, therefore, they have encased them in steel and concrete. It requires a very accurate weapon to be able to hold them at risk. They fit into categories like ICBM silos; they have command posts; and they have launch control facilities.

A second group of targets is soft targets, or area targets—things like their radar sites, their surface-to-air missiles, their airfields, their submarine bases, their naval facilities, factory complexes, communications centers, and economic types of targets.

The third set is what we refer to as mobile targets or relocatable targets, in that they are of strategic value, and yet they can be moved around.

There are the ICBMs. They have, as you know, train borne ICBMs in the form of SS–24's. They have road mobiles in the form of SS–25's. Their aircraft are all mobile and can go from one airfield to another. Their surface navies, once they leave ports, and their armies, once they leave garrisons, they each fit into a target set that we call mobile targets.

WHAT WE HAVE TO DO IT WITH

	STRENGTH	WEAKNESS
ICBM	PROMPT RESPONSE ACCURATE (PKPR, MMIII) C3	NOT MOBILE LESS ACCURATE MMIII INFLEXIBLE
SLBM	SURVIVABLE (D-5 ACCURATE)	C3 LESS ACCURATE C-4 INFLEXIBLE
ALCM	ACCURATE	SLOW ARRIVAL INFLEXIBLE
PENETRATING BOMBER	SURVIVABLE ACCURATE HIGH YIELD FLEXIBLE WEAPONS PER A/C	SLOW ARRIVAL

Now, against that target base, I have these types of weapons, each of which have their strengths and each of them have their weaknesses.

The ICBM, for instance, is a prompt response weapon in that it can be fired very quickly from the time the President makes the decision and arrive in the target area in a matter of minutes. It is extremely accurate. The Peacekeeper is the most accurate weapon, ICBM, or SLBM, that the country has today. The command and control with those are very robust.

The weakness of an ICBM today is that it is not a mobile system. The Minuteman III is not as accurate as is the Peacekeeper, and it is inflexible in that I have to be able to target many hours prior to being able to launch it. So I cannot get new information and quickly put that in it and quickly fire it.

The submarine launched ballistic missile has great strength in the triad. First of all, it is because it is survivable. When it is at sea, it cannot be found and targeted by the Soviet Union.

Soon we will have the D-5 missile on board that submarine, and with its proposed accuracy, it is going to be a significant increase to our deterrence posture.

The problem with SLBMs is that communication is more difficult with submarines than it is with land-based, surface forces. The C-4, the current missile, is not as accurate as we need to hold certain target bases at risk, and it, too, being a missile system, is less flexible than is a bomber, because of the time required to be able to insert new information.

The ALCM is a very valuable weapon to us, again, because of its accuracy. Its weakness is that it does not get to the target area very quickly, and it, too, is inflexible in that I have to program it before it takes off from the ground on the bomber, and then, once

it leaves the bomber, again, it has to go to the target that has been preprogrammed into it.

The penetrating bomber has its strengths. For one, it is survivable and I have the authority, which has been vested in me by the President of the United States, to be able to launch our bombers and tankers if the United States came under attack—not to go to their target, but to have them go airborne, to be survivable.

The bomber is very accurate, the most accurate weapon system we have. They deliver weapons that have high yields, and there are certain targets where I have to have a big bang in that particular weapon. It is flexible in that the pilots and the crew on board can be given a series of options which they can operate and execute on station. I will talk more about that in a few minutes.

They carry a lot of weapons per aircraft—an average number of 20 weapons per aircraft. And so, they have a great deal of strength. Their big weakness is that they do not get to the target area for a number of hours.

WHAT ELSE INVOLVED IN TARGETING

CROSS TARGETING

- RECOGNIZE PROBABILITY OF ARRIVAL/DAMAGE LESS THAN ONE
  - COMMUNICATIONS FAILURE
  - SYSTEM FAILURE
  - PENETRATIVITY
  - INACCURACY

There is one other factor involved when we sit down to target, and that is we need to cross-target, in that some of the weapons that are scheduled to go to a target may or may not arrive. Therefore, we have to back them up.

There may be a failure of the system, there may be a failure in communications, it may not be able to penetrate, and it may not arrive with the accuracy that we have to have. Therefore, we have to be able to use more than one system against the highly valued types of targets.

HOW WE TARGET TODAY

- SHOOT AT WHAT'S SHOOTING AT US
  - COUNTER BATTERY FIRE
  - PKPR
- HARD TARGETS
  - PKPR
  - ALCM
  - BOMBER
- SOFT/AREA TARGETS
  - MM
  - SLBM
  - ALCM
  - BOMBER
- MOBILE TARGETS
  - BOMBER

"LOOK-SHOOT" BOMBER TARGET

- ASSESS DAMAGE
- STRIKE/RESTRIKE
- CONTINUE ON

So, what are those categories? Let me review them with you again, and what type of weapons do we use against those categories?

The first target that I worry about is what is shooting at us. For those who are artillery officers by background, you recognize that as counter-battery fire. When the Soviets launch an attack against the United States, the first thing we are going to want to do is to counter that ongoing attack, which will be their ICBM silos. The most accurate weapon that I have to do that with is the Peacekeeper, because of its accuracy and the time of flight. So that is what that weapon is primarily good for.

The second group of targets are hard targets. For that we need a high yield. But we also need a very accurate weapon.

So, again, the Peacekeeper can be used against those targets. The ALCM can be used against those targets. And the bomber, because of its accuracy and yield, is used against those targets.

The third group is the soft and area targets. Again, the ICBMs that do not have as much accuracy, can be used against those. The SLBMs can be used against those. The ALCM can be used against those. And again, the penetrating bomber, with the gravity weapons, and also the SRAM weapon, is very valuable against that target set.

For mobile targets, which are the relocatable targets, the only weapon system that I have that can hold them at risk is a penetrating manned bomber.

One of the important areas is the look-shoot type of target. A look-shoot target fits into these other categories, in which the

bomber crew flies to a target that should have been attacked already by another weapon.

They look at the target and assess the damage. If it has not been hit, they strike the target. If it has been hit but it has not gotten the degree of damage that it is supposed to have received, they restrike the target. If it has been hit and has gotten the level of damage it requires, then the bomber just flies by, saves that weapon, and goes to the next target. So, although a bomber may have 20 weapons on board, the number of targets that they are holding at risk is significantly more than that.

The point is that all of our weapons are valuable to us. The most flexible weapon and the most valued that I have is in the manned penetrating bomber.

OUR PENETRATING BOMBERS

1988	1992	1998
54 FB-111	0	0
69 B-52 G LOW DEFENDED	0	0
96 B-52 H LESS DEFENDED	71 B-52 H LESS DEFENDED	0
97 B-1 HIGHLY DEFENDED	97 B-1 HIGHLY DEFENDED	97 B-1 LESS DEFENDED

- LATE 90's MUST MOVE B-1 FROM HIGHLY DEFENDED AREAS
- NEED OTHER PENETRATING BOMBERS TO HOLD AT RISK THE TARGET SET

So, how many penetrating bombers do I have and how can I carry out my task?

In 1988, up until last October, 9 months ago, I had 54 FB-111's in the SIOP. I had 60 B-52G's that were what we call penetrating bombers in that they were going inside the Soviet Union; and another 96 B-52H's that are also in the penetrating role. Both the G and H go into the lower defended areas. I have 97 B-1's that can penetrate into the highly defended areas.

However, on October 1 of last year, we removed the Gs from the penetrating role because they cannot get into the defended areas inside the Soviet Union. So I had to take 60 aircraft out of the SIOP.

In 1990 and 1991, I remove the FB-111's from the strategic penetrating mission and they are transferred to tactical air forces and they will become trainer assets. So I drop from 308 down to 168

penetrating bombers. Some of the B–52H's come out of the penetrating role, again because they cannot get into the target area that I am going to need them to get into. That leaves me 97 B–1's going into the highly defended areas.

Senator EXON. General, could I interrupt you right there so we can make that point clear.

If I understand what you just said, in layman's terms you were saying that by 1992, your strike force is going to be essentially cut in half unless we do something about it. Is that another way of putting it?

General CHAIN. Yes, sir. Even when you do something about it, I am going to have to live with this for a few years, until the B–2 starts coming into the inventory in numbers.

But what really ends up impacting me and my successors, sir, is by 1998, the Hs are no longer going to be able to penetrate because of the evolution of Soviet defenses, and my successors and our country are going to be left with 97 B–1's in a penetrating role. But again, because of the increase in the Soviet defense capability, the B–1's are going to have to go from the highly defended area into the less defended area.

I am going to need another penetrating bomber to be able to hold at risk the targets that I have been told to be able to hold at risk inside the Soviet Union. So it is not "if" we need a penetrating bomber. I have to have a penetrating bomber. So the question is what is that going to be.

1989 SOVIET RADAR NETWORK

Today, generically—obviously because of the classification of this briefing, I cannot put exact spots on the chart—but generically,

this is what we see when we look at the Soviet Union and their radar pattern and the associated defenses that go with it.

By 1998, this is what we look at, where they have the AWACS type of aircraft off their shore and the internal part of their country ringed densely with overlapping radar systems.

From a B–52 or a B–1 perspective, this is what the crew is going to be staring at.

WHAT RADAR NETWORK LOOKS LIKE TO THE B–2

This is what a B–2 crew would be staring at.

I cannot put these circles on the chart at the proper size, obviously because this is an unclassified briefing. But generically, the circles will have been shrunk significantly, and, basically, the B–2 will be able to come into the Soviet Union and go through the Soviet Union without being countered by any Soviet radar system. It consequently can do the job it is tasked to do.

I do not have anything else now or on the horizon that can do that besides the B–2.

HOW MANY PENETRATING BOMBERS WE WILL NEED

THE LOGIC TRAIN:

- **HOW MANY TARGETS?**
- **CATEGORY OF TARGETS?**
  - **TYPE**
  - **SIZE**
  - **HARDNESS**
  - **DEFENSE**
  - **TIME URGENT/PROMPT**
- **DAMAGE REQUIRED?**
- **DAMAGE CONFIDENCE REQUIRED?**
- **MOBILE?**
- **PENETRATORS AVAILABLE?**
- **WEAPONS AVAILABLE?**
- **PROBABILITY OF ARRIVAL?**
- **WITH START -- WITHOUT START?**

= 132 B-2s REQUIRED

Now, how do we come up to the numbers of the B-2s that we need?

We have a logic train. I have to start with how many targets I have to be able to hold at risk, what the categories are, and I have already described the types of categories we look at. Also, what is the damage required? How much damage do we have to inflict on it. What confidence do I have that a particular weapon system is going to be able to deliver that much damage, whether they are mobile or not mobile? Will the bomber itself be able to penetrate? How many penetrators am I going to have? How many weapons, total weapons, am I going to have? What is the probability of the arrival of an ICBM, an SLBM, a bomber, or an ALCM? And what do I need with START, and what do I need if we don't have START?

The bottom line ends up to be the number that the Air Force has asked for is the number of bombers that we need to add to the B-1s in a penetrating role.

WHAT'S THE IMPACT OF START

6000	TOTAL WEAPONS
4900	ICBM/SLBM WEAPONS
1100	BOMBER WEAPONS
	ALCMs COUNT 1 EACH
	PENETRATING BOMBER COUNTS 1 EACH
	NO LIMITATION ON BOMBS AND SRAMS CARRIED

THE VALUE -- AND REQUIREMENT -- FOR STRONG BOMBER FORCE CANNOT BE OVEREMPHASIZED

I would like to shift for just a moment and talk about START.

As you know, the outline of the agreement that is being negotiated between the Soviets and the United States says that each side can have 6,000 weapons. I can agree with that. The problem that I have, however, is that I have more targets to hold at risk in the Soviet Union than they have to hold at risk in the United States. So 6,000, equally, on both sides is interesting. But they end up with a new advantage, even at the 6,000 level. Now, 4,900 of that 6,000 can be ICBMs and SLBMs, which leaves 1,100 weapons that can be bomber weapons.

Now, ALCMs will count as part of those weapons. However, at Reykjavik, in 1986, President Reagan and Secretary General Gorbachev agreed that whatever is internal to the bomber, gravity weapons and SRAM weapons, will not count. The bomber itself will count as one weapon, but what is internal to it will not count unless it happens to be a cruise missile. Therefore, I get 20 for one weapons that are going to be available to me as the Commander-in-Chief of Strategic Air Command.

So, the value of the bomber in a post-START environment escalates significantly. Without the bomber in the post-START environment, I would have a very difficult time, and I can tell you right here, up front, that I could not support a START agreement. I have to have those weapons available to me.

The Soviets have recognized that and made the proposal at Reykjavik, which we agreed to.

Senator EXON. Which we could not have agreed to at that time, in your opinion, General, had we not had the B-2 coming on line?

General CHAIN. If we did not have the B-2 coming on line, the whole START agreement that the Joint Chiefs had generically agreed with the thrust of, the whole agreement would have to come under review because of military sufficiency.

I am not the one to ask that. General Welch, as a member of the Joint Chiefs, can address that more clearly, or the Chairman, obviously.

But the bottom line is Chiefs would have to start, and we would make a complete military sufficiency review of any new proposal if we did not have the B–2. They are assuming strategic modernization when we say we can support the current proposed START agreement.

SO WHAT

- THE TRIAD OF FORCES HAS BEEN SUCCESSFUL AND WILL BE REQUIRED PAST TURN OF CENTURY
  - ICBM, SLBM, BOMBER
- US NEEDS PENETRATING BOMBERS TODAY
- US WILL NEED PENETRATING BOMBERS TOMORROW
  - VERY IMPORTANT WITHOUT START
  - CRITICAL WITH START
- ONLY WAY TO PENETRATE IN LATE 90s AND BEYOND IS BY USE OF SOPHISTICATED TECHNOLOGY
- B–2 WITH STEALTH CHARACTERISTICS IS ABSOLUTELY NECESSARY FOR ME AND MY SUCCESSORS TO DO THE JOB OF DETERRENCE

So the bottom line of what I am talking about is that the triad has been very successful in providing deterrence, which has been the underlying reason for having these forces for many years, ever since the advent of the triad. That includes ICBMs, SLBMs, as well as the penetrating bomber.

Synergistically, they work very well. You cannot attack one leg of the triad and get away with it. To make an attack, you have to be able to attack all three legs if you are going to be able to reduce our deterrent capability.

We have to have, in this country, a penetrating bomber today. I cannot stand in front of you and tell you I could carry out my mission if I did not have a penetrating bomber today. And, in a post-START environment, it is going to be absolutely critical to have bombers that can penetrate.

The only way to penetrate in the late 1990s is through technological superiority. No one has come up with anything better than the B–2. There is nothing else on the drawing board to replace the B–2. Consequently, I am going to need the B–2 aircraft to be able to carry out the mission of deterrence, which is my primary mission as the Commander-in-Chief of Strategic Air Command.

There is one other area that is not on the chart but which Senator Glenn makes a very good point of: not only is this aircraft going to be very capable and imperative for the strategic deterrent pos-

ture, but having it, it is going to have this great capability in the conventional role.

In SAC, I have a nuclear responsibility. In SAC, I also have a conventional responsibility. With the range of this aircraft, with the payload—50,000 pounds worth of payload—it can take off from the United States and, with one refueling, go 10,000 miles. There won't be any place in the world that the United States will not be able to project force, if needed, during times of problems in the Middle East, in Africa, in Central America, or in any place else in the world.

So, the value of the B–2 is critical for the SIOP role. The value in the conventional role is going to be equally important to the country.

Thank you, Mr. Chairman.

Senator EXON. General, thank you very much.

Before we go to questions that the panel will have, I would like to ask the two test pilots that we have here this morning to give us their evaluation of the experience that they had last week.

Welcome to you, Mr. Hinds. Welcome to you, Colonel Couch. Whichever one of you wishes to go first, go ahead, and the other one can follow.

STATEMENT OF BRUCE HINDS, NORTHROP CORP., B–2 TEST PILOT

Mr. HINDS. Thank you, Mr. Chairman.

I guess we are going from the macro to the micro here.

Senator EXON. Would you pull the microphone just a little closer, please.

Mr. HINDS. Yes, sir.

We can discuss the technical things that we did on the first flight.

We were pleasantly surprised on the amount of data we got, the characteristics of the airplane, and with the correlation we had with the simulation and laboratory tests that we have done over the past 10 years.

The up-and-away simulation correlated very closely with the flying characteristics of the airplane. There were some concerns we had with the ground effect or the cushion of air that is beneath the airplane that we noted in simulation and we also saw in the Total In-Flight Simulator (TIFS), the Calspan airplane used for evaluations.

The takeoff that we did at Palmdale was very straightforward. We put in the power, rolled down the runway. Performance was pretty close to what we predicted.

I rotated the airplane. My target attitude was 7.5 degrees, and the airplane lifted off smoothly at 6.5 degrees. There was no noticeable effect on the flight controls from this ground effect phenomenon that we were concerned about.

We accelerated, once I captured 7.5 degrees we accelerated out to 180 knots. I climbed up to 6,000 feet, did a level-off, where we had a chase airplane come in and check over our systems. This was to ensure we had no hydraulic leaks, no parts had fallen off, that the gear was intact, and those kinds of visual inspections.

The airplane looked very good. We continued our climb up to 10,000 feet in the Edwards airspace. We did some maneuver blocks. The maneuver blocks that we did were basically checking out the handling characteristics with the gear down. They proved out very close to our simulation.

We did some roll maneuvers, pitch maneuvers, yaw maneuvers. The directional stability of the airplane or the ability to keep the airplane going on the right path was very good.

Our rudder kicks that we put in there was about one overshoot, and the airplane steadied directionally.

This airplane, not having a vertical surface or a long tail has caused some people concern. But the drag rudders on the end of the wings have a very large restoring moment, and work very well on the directional stability of the airplane.

The pitch stability was very good and matched our predictions very closely.

The entire trailing edge of the airplane is control surface. These are very large control surfaces and two-thirds of that control surface there helps us out in pitch.

A very fast actuating system enhances stability considerably, so it damped out very nicely. The pitch was very pleasant.

On roll rates, we did some bank-to-bank maneuvers, where you roll the airplane. We did it with a quarter stick, half stick, and three-quarter stick. Again, the big control surfaces acted very well. The coordination, of the adverse yaw or side slip, that you get from making a roll maneuver was well controlled. The on-board computers of the airplane controlled the yaw very well. So the maneuvers that I did were feet on the floor, and the computers enhanced that stability greatly.

The roll rates were very responsive. Very responsive for this kind of airplane. For a 172-foot wing span, it was considerably faster than you can see in a B–52, not quite as fast as you would see in the B–1. But it is more than adequate for the task.

We also did maneuvers with throttles. As you know, we have four engines. The two engines on each side are closely nested inside the wing. We are very interested in the airflow characteristics of the engines going over the wing and through an S-inlet and an S-exhaust.

We pulled the throttles to idle and in rapid fashion put them up to take-off rated thrust. Again, the flight controls handled the yaw maneuver with that asymmetric thrust very well. Again, it was a feet on the floor maneuver, it was not necessary to put rudder in to control yaw.

Initially, I did put a rudder in on the first maneuver, and then I found it unnecessary to put it in for the second maneuver.

The engine performed flawlessly, which made us very happy. It is a fan-controlled, or the initial stage of the engine controls the thrust. It is very responsive to throttle setting, and it does not hunt at all.

We did practice landing maneuvers at altitude. They were very benign.

We did some banks, up to 50 degrees, to get the stick force as we pulled back. Going into a bank, we got to around a 50 degree bank, and the turn performance was very nice.

After our practice landings, we came in and made a landing at Edwards. We used a 140 knot approach speed. The airplane was very stable on final. We did not see much control activity. Even though it is a highly augmented control system, the controls did not move around a lot.

The flare maneuver we thought, again, there might be a floating characteristic with this cushion of air as you land. We did not see that. It was very straightforward. The airplane rotated, and we touched down on our computed air speed.

After touchdown, 1,000 feet down the runway, I stopped at 5,000 feet down the runway. There was a slight pull to the left. The left brakes were working better than the right, and we varied about 35 feet from the center line. Again, that was adequate performance.

Then we taxied to the middle of the runway at 7,500 feet. Edwards has a 15,000 foot runway. So we used 5,000 feet to land, and turned off at 7,500. We then taxied in, and did our post-flight checks with instrumentation.

Overall, the data looked very good. I think the up-front simulation that we did paid off. We were able to do a lot of tweaking in the simulator that ended up beneficial.

The basic systems of the airplane held together very well. We had no significant problems with either the engines, fuel system, hydraulic system, or the environmental control system.

After landing and doing the post-flight inspection, normally on this kind of flight you expect some kind of significant leak or maintenance activity, but we did not see any of that.

I think, Rick, you probably have some more comments that you would like to give.

Senator EXON. Mr. Hinds, thank you very much.

Colonel Couch.

STATEMENT OF COL. RICK COUCH, USAF, B-2 TEST PILOT

Colonel COUCH. I think Bruce did a good job of summarizing pretty well what went on in the flight. It really was the first look at the airplane, the first opportunity that we had to fly it, and the first look was a good look.

We were very pleased by everything that we saw. We were very pleased by the group effort that went into getting the first flight off on the airplane and how well Northrop and the Air Force worked together in making that happen and making it happen well.

A little known fact in turning this airplane the first time and getting it off the ground was that we have had Air Force maintenance people working on this airplane for about a year and a half, as the aircraft has completed its manufacturing effort and checkout.

These blue suiters that work on the airplane have been making contributions to inputs in design changes in the airplane so that when we actually get airplanes in the Air Force inventory, we will be able to maintain them. We have made some great strides in that area.

It was good from my perspective, being the blue suit guy in the cockpit, to actually see Air Force maintenance people supporting that first flight. That was fairly exciting.

The optimization of the flight controls for this airplane has gone extremely well, and we have spent literally hours in simulators, hours in wind tunnels, trying to bring together the technologies and to make those technologies work well in designing a flight control system that meets every aspect of the military specification for it.

Our first look, even though it was a very limited look, at the flight control system optimization tells us that things went extremely well and it should go well when we start flying the airplane and start expanding the envelope.

We look forward to the second flight and, with some luck, between now and 4 weeks from now, we'll be able to fly the airplane a second time.

Senator EXON. Colonel Couch, thank you very much.

We will now go into the general questioning, and we will have a 5-minute time limit per Senator.

I will start out by emphasizing a point that I think is critical in our whole determination. It was alluded to by Senator Warner in his opening statement.

Not only has the Congress known about the status and cost of this program for some time, I believe that John Warner and I were advised of this highly black program 10 or 11 years ago, when it was very black. I think we have been looking forward to this flight for a long, long time, and some of you were involved in it considerably before that.

I would simply add to Senator Warner's statement that not only have previous Congresses approved this program, but so have three separate administrations—the Carter administration, the Reagan administration, and now the Bush administration. I think this indicates that those administrations, their civilian and military leaderships in the area of national security, have seen the promise that this plane holds.

Your presentation was very good, General Chain. If there is one thing that I would just like to highlight once again, is that I think we should emphasize the B–2s relationship to the START agreement. It is not improper to say that, given the geographical expanse of the Soviet Union and their large dispersal of their defensive and offensive forces, you, as the SAC Commander, would be facing the difficult position under START of having, essentially, the same number of weapons to use to attack the same number of targets, whereas the Soviet planner would have about half the targets to attack that you would have to be concerned about in the event of an exchange.

Is that essentially right?

General CHAIN. Yes, sir. One small difference is that I will not have the same number of weapons that I have today because under START, the weapon count will actually go down and the target base will also change, but not to the degree that the number of weapons goes down. So each weapon is going to become even more important in the out-years, in a post-START environment, than it is today.

Senator EXON. In my opening statement, General Welch, I focus on what I think is just not basically understood by many Members of Congress and others. This has to do with the START program.

If the Congress had terminated the B-2 program so that we would retain only B-52's, which General Chain talked about a great deal in his briefing, and the B-1B in the bomber force, and if our negotiators were successful in reaching a START agreement along the lines of the current draft, would you regard this as a militarily acceptable agreement? By that I mean would you consider it a militarily acceptable agreement without the B-2?

General WELCH. I think I would give a little longer answer to that than just yes or no. It is this.

As we evaluated the sufficiency of the START positions that we have advanced in these negotiations, we have counted very heavily on strategic modernization in all three legs of the triad. We have particularly counted heavily on the contribution of the manned penetrating bomber.

I simply cannot believe that we could proceed with negotiations on that basis where we have a drastically different expectation about the contribution of the manned penetrating bomber. So I guess my answer would be that I find it largely inconceivable that we could continue with current negotiating positions without the B-2.

In my view, we would simply have to go back to the drawing board and virtually start over in crafting some new negotiating position, which I cannot lay out for you this morning because I have no idea where that would lead us. But clearly, we would virtually start over on that overall negotiating position. I think that is not just my personal opinion. That has been clearly stated by the Joint Chiefs on several occasions.

Senator EXON. Thank you. My time is up. But one last quick question on the same subject to you, General Chain.

As the direct operating commander, let me ask you how you would feel in the year 1994 or 1995 about being the Strategic Air Command Headquarters Chief under the proposed draft of START as we know it today, with no B-2s?

General CHAIN. I would come and testify in front of your committee against a START agreement.

Senator EXON. Thank you, General Chain.

My time is up.

Senator Warner.

Senator WARNER. Thank you very much, Mr. Chairman. Again, we express our appreciation to you personally and to Senator Thurmond for initiating these hearings.

I want to pick up on Chairman Exon's question, General Welch, and try to put it into language so that a lot of the people who are watching television today can understand some of the things we have known for a decade.

Following on his questions, if the Congress—and the Congress has to act on this program theoretically between now and September 1 of this year; so we are talking of but a few weeks—if we pull the plug and if we stop, did I understand you to say that our negotiators would have to get up and walk away from the negotiating table at the START talks?

Isn't that it, in blunt language?

General WELCH. It is certainly true that we would have to formulate an entirely new START negotiating position.

Senator WARNER. Which means we would have to withdraw from the basic framework that we have agreed on today, namely 4,900 land- and sea-based and about 1,100 additional missiles.

Isn't that correct?

General WELCH. That would be my opinion. As to how we handle the negotiations, that is above my pay grade. But, clearly, we would have to have a new position.

Senator WARNER. But the JCS is a partner with the President of the United States and he consults regularly with you and relies on your judgment as he formulates the instructions to our negotiators.

I think you have said here today that it would be your recommendation to the Chief and other members of the JCS that we would have to stop the negotiations if we pulled the plug on the B–2 and stopped it.

General WELCH. We would have to start over to formulate any kind of sensible position.

Senator WARNER. Let me then pick up on a second question.

I read in this morning's press that House Armed Services Committee Chairman Les Aspin said he wants this program to go "cold turkey and freeze it." What would that do to the cost, General Welch?

General WELCH. That is a euphemism for cancel the program.

If we were to stop this program and try to restart it at a later date, given that the cost is such an issue, in my view, that would clearly make it impossible to restart the program.

So that is simply another way of saying "end the program."

Senator WARNER. Now I would like to turn to General Chain.

I have had the opportunity, as have other members of this committee, and indeed many Members of Congress, to come out and visit the Strategic Air Command headquarters, at which time you go through a classified presentation of exactly what factors are considered when the United States and the Soviet Union examine their assets.

Now, I would like you to cross the ocean and put yourself in the seat of the man in the Soviet Union who has your responsibility. Presumably he is advising the head of state and government or the Politburo, or however the Soviets want to run their nation, as to what the risks are if they initiate a first strike against us.

What does the B–2 mean to your counterpart in the Soviet Union?

My understanding—and we cannot get into the classified data—is that the B–2 stands there and it perhaps represents that one great question mark that he cannot fully describe to the Soviet leadership.

They have two alternatives. The first alternative, we hope, is to continue as we have now for some 30-plus or 40 years, with no use of these weapons.

The second is to install an air defense system which, in comparison to the $70 billion we are planning on for this aircraft, is many times that sum.

The first question is what would be the cost of an air defense system, if they could devise one?

General CHAIN. I don't think we have run out those numbers, but I think you have hit right on it. It would be a multiple of what the cost for the B–2 would be.

Sir, right now there is no existing technology that they could employ to counter the B–2.

Senator WARNER. Assuming they embark on it, it is at least three or four times as costly to devise a defense system as the projected $70 billion cost of this program.

General CHAIN. All defensive systems are always more expensive than the offense. So it would be a multiple of what we are spending on the B–2.

Senator WARNER. Now, absent a defense system, which you say they technically cannot put together at this time, what is in the mind of your counterpart, as he knows of the existence of the B–2 here in the United States under the command and control of the President?

General CHAIN. I have said often, Senator, that my one responsibility in life is to make sure that my counterpart in the Soviet Union can never go to the General Secretary and say: hey, boss, I figured out a way to attack the United States today and get away with it. As long as I can do that, then I am successful in deterrence.

I know that today I can make that statement to you, that they cannot come up with a viable game plan.

In the late 1990s, if we did not have the B–2, then the level of risk in the deterrent equation would increase significantly from our vantage point and, therefore, the incentive to attack would go up in the vantage point on the other side. Where they would cross the line, that someone throught they could make an attack and get away with it, has to be in the mind of the beholder.

Our posture in the United States has to be that they never reach that line where they can even conceive that they might be able to come up with some way to attack the United States' nuclear weapon deterrence systems and be able to get away with it.

Senator WARNER. We say that this program, or, rather, others say that is is too expensive. But it does prevent your counterpart from giving any assurance to the Soviet leadership that they could survive a B–2 attack?

General CHAIN. It is a critical part of our deterrent equation.

Senator WARNER. Thank you.

Senator EXON. Thank you, Senator Warner.

Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman.

Gentlemen, I need to stress that I share your enthusiasm for the potential combat capability of the B–2, but I am concerned that we verify that potential with adequate flight testing before we buy aircraft beyond the 16 that we already have in various stages of preparation right now.

This has gotten to be a very expensive machine. The total program costs $530 million a copy. General, you can modify that as you see fit, here, but that is the basic, accepted figure. It is a tremendously expensive weapon system.

The point I would make is it is going to be very, very much more expensive if we have to modify all those airplanes as a result of testing.

Normally, with a new aircraft, we test it, we make some of the early changes. Meanwhile, some of the very, very early production is just getting underway. But we make major changes before we get to production.

Now, the problem with the B–2 has been that the first flight has slid 18 months. We've had major problems with it. We've modified the program a couple of times, so it has not been trouble-free. We are 18 months, almost 19 months, now, behind.

But we have 16 aircraft coming down the pike. We know that once you get to flight testing on even such things as the T–45, a simple little trainer plane—we got to flight testing and delayed it 2 years by what we found. We are in the middle of that right now. The H–60 helicopter is delayed a year because of what we found when we got to flight testing, even though we spent an awful lot of time with wind tunnel analyses and all sorts of things.

The advanced technology fighter—we are planning to go to a prototype first, to fly it and get some experience with it. Then we'll know what we're doing.

The B–2 has brand new aerodynamics. It does not have that stabilizing tail back there for lateral and longitudinal stability. We have new low observability, without which we probably would not be buying the airplane at all, and that is not tested at all.

Now, in the Block One flight testing, we do only minimal, compared to the combat mission, minimal flying qualities and performance testing. We may get some expansion of the speed and altitude envelope, but we will not have the full weight and maneuverability part of the envelope to add to that, that makes a real combat airplane.

For the first time also on this we are going to have a new monitoring system, a systems maturity matrix, which, every year, will give us the gates at the airplane that its testing has to go through before we approve the new buy.

Now, what I proposed in committee was when we have 16 coming down the pipe and we know that every new airplane we have ever built, no matter how much advanced testing, wind tunnel tests, and whatever, still has a lot of changes that are going to be made. And on this airplane, above all I have ever heard of, it is probably going to be very expensive to make retrofit changes.

What is wrong with holding up those three additional this year until the system's matrix kicks in in the fall of next year, which is just about the time it is going to take us to get through Block One and the initial low observable testing.

It makes sense to me that we not do additional procurement until we find out what we are doing with flight testing. What would be your response to that?

General WELCH. Senator, clearly, the lowest risk approach to buying a new aircraft would be to buy some number of test aircraft, whatever might be adequate, and then to stop all other activity until you have thoroughly tested the airplane and are assured that there will be no retrofit requirements. Unfortunately, that is prohibitively expensive.

So we have to weigh the technical risk involved with the degree of concurrency that exists in this program, at this moment in time, against the cost of reducing that concurrency.

With each of those adjustments in the technical development of this program that you have mentioned, we have adjusted the schedule accordingly, to ensure that we don't allow concurrency and, therefore, development risk to increase on this aircraft.

Just for example, the actual engine and air worthiness flight characteristic risks on this airplane are minimal. The real test chore on this airplane will be the integration of the avionics and the integration of the combat capability.

You mentioned the fact that the airplane doesn't have a tail. The fact is that we have some 2,000 F-16's flying, which depend totally on the flight control computer for stability. They have no static stability. They were intentionally designed to rely totally on the flight control computer, because it greatly increases the combat capability of the aircraft.

There are 2,000 of them flying today. We know how to do that.

So I am not arguing that there is zero risk. But I am saying if you stop the production of those three aircraft, then the cost to the program of doing that is somewhere between $2 billion and $4 billion, depending upon your assumptions about the rate of startup, having stopped that production buy.

So, you have to ask yourself whether or not you believe we have $2 billion to $4 billion worth of retrofit possibilities facing us on those three airplanes. To put that in context, the total additional retrofit cost to the B-1 is $489 million. That is what it will cost us to do something to the B-1 that we did not expect to have to do, and that is to install the autonomous radar warning system.

Having done that, we will be over the original forecast price of the B-1 by $330 million. When we compare those kinds of numbers to the decision that would inevitably and certainly add somewhere between $2 billion and $4 billion to the total cost of this program, I just think that is bad economics, Senator.

Senator GLENN. My time has expired. But, as I recall, I thought the figure that we were given was $1.7 billion, which could be amortized out over the length of the program, which did not make it much per year.

I think, then, additional figures that we got indicated that some of that would have to be front-loaded, more back into the near outyears. But, anyway, I just say fly before buy. If there is one thing we have learned, that's it. That's basically what I'm talking about, getting on with this test program.

I really think we are getting into bigger expenses by not holding up at least the addition of three additional aircraft.

Thank you, Mr. Chairman.

Senator EXON. Thank you, Senator Glenn.

Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman.

General Chain, you said something which caught my attention.

Basically, your earlier testimony is that because of increased Soviet defensive capabilities, you are losing about half of your manned fleet from the SIOP over the next 4 or 5 years, having lost some of it now.

You then go on to make the statement that all defensive systems are always more expensive than the offensive systems that confront them.

It seems to me that Soviet defenses have driven us to this posture, and they have eliminated, by your testimony, half of what we have already prepared against them, and that really does not take into account any of the consequences of double targeting, et cetera, that you have to do to overcome the Moscow defenses.

So I guess I would ask you if you might not want to reconsider such an expansive statement, that all defensive systems are always more expensive?

General CHAIN. No, I won't retract that statement at all. They have been willing to put the money in. They are spending about 16 percent of their GNP routinely on their military.

All of this rhetoric about perestroika and glasnost, which I happen to support, generically, has been very interesting, but it all deals with tactical systems. They have not cut one rouble out of their strategic systems, which include offense and defense. So they have been pumping that money in. It is because they are pumping that money in that I have had to pull out the B-52s.

If they had not been doing that, then the B-52 would have been able to continue for many more years in the penetrating role.

Senator WALLOP. Then the need for the B-2 would be less.

General CHAIN. Exactly.

Senator WALLOP. Well, I think that makes my point and not yours.

General CHAIN. I don't think so.

General WELCH. I think it is a matter of arithmetic, Senator. There is no question that it is the Soviet investment in defenses that makes it necessary to have the B-2. The point is that it requires far more of a Soviet investment in defenses to counter the B-2 than it costs to build the B-2.

Senator WALLOP. But you are assuming only that it is directed at the manned bomber part of the triad, and it is not. It is clearly directed, as well, at ballistic missile systems.

Are you saying the Soviets have made no investment in ballistic missile defenses?

General CHAIN. They are, but that is not the part of the dollars that they are spending against the air breather. The dollars they are spending against the air breather include the cruise missile and the manned penetrating bomber.

Senator WALLOP. And you sense there is no dual capability in any of those systems?

General CHAIN. I sense that there is no dual capability in the systems that they have built against ICBMs. There aren't any dual capabilities against the ICBMs and an air breathing weapon system.

Senator WALLOP. Why are ICBM silos a target of a manned bomber, presumably arriving 10 hours after the war has started, since those that we know about will have been used?

General CHAIN. Those that we know about may have been used. The first weapon, as I tried to point out, that we send against that silo is the Peacekeeper weapon, because of its accuracy. It would be

a complete drain if all the silos were to absorb all of our ICBMs. We use ICBMs against them.

The ICBM may or may not have arrived at the target, may or may not have destroyed the target. There may or may not be a missile in it. But if the missile is in it, then we negate its further use.

But, as importantly, we also end up taking out the silo itself, which is a reusable container. The Soviets have many more missiles than what they have in the silos themselves, and they practice routinely putting new missiles in the silo. They want to be able to hold that at risk so the silo doesn't exist anymore and cannot be reused.

Senator WALLOP. Once again, that is an old arms control aberration, that what we were doing was counting holes in the ground and not things that kill people.

But it seems to me—and I am speaking as an advocate of your airplane and your need for it in the arms control arena—I think you, as well, make a very strong argument for the necessity of going on with a robust defense over here.

I, frankly, would rather kill the things that came out of the silo than kill the silo when it is empty. So I think to me, what you are doing is making good, strong arguments in behalf of broadening the whole deterrent capacity of the United States, and I support that.

Let me ask one last question.

General Welch, how long, just estimating, and what would it cost to recast our START negotiating position, absent the B-2 being a part of it?

General WELCH. I really have no idea what process and at what pace that would move, Senator.

Let me, though, respond just a little further to expand on your point, on the business of what you gain from what you attack.

I think it is very important that we bear in mind that not only would I rather attack the things that come out of the holes than attack the holes, I would even rather ensure that no Soviet could ever believe that bringing anything out of that hole would pay off.

Any time we move from talking about deterrence to speculating about how things would unfold once deterrence fails, we are in a pretty futile business. There are those who question the value of a bomber weapon arriving on a target 8 hours after we have had this terrible exchange of ballistic missiles. That is not the point.

The point is, in terms of a Soviet planner's perspective, in terms of what will happen to the Soviet Union should they elect to attack the United States, it doesn't make very much difference to that decision maker whether or not his asset will disappear in 30 minutes or 8 hours.

So it is the very fact that the Soviet decision maker knows that the result of his action will be the destruction, the inevitable destruction, of all of these things that are of such great value to their society, that is the essence of deterrence.

If this does not work, if deterrence fails in spite of that, what unfolds after that is really not very interesting, and that is a subject that academics can speculate on. I don't find it very useful.

Senator WALLOP. I don't quarrel with that.

My time is up. Thank you, Mr. Chairman.

Senator EXON. Thank you very much, Senator Wallop.

Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

Gentlemen, welcome to our panel this morning. We have talked about risks this morning of a number of kinds, and, of course, the first and foremost risks are to our crews that will be flying this bomber. Our test crews sure did very well the other day and we are very proud of you. That is the first and foremost risk that we are concerned about.

We are also concerned about the financial risks obviously. Senator Glenn has gone into one aspect of that, which is what would be the costs of delaying this year's production.

General, you have indicated approximately what those costs would be. Something in the area of $2 billion would be risked. If we would be at risk, it would cost us that much more if we delayed production for this year.

One of the questions that we have to decide is whether or not we want to pay another $2 billion in order to have more flying before we buy more. That is a judgment which would make my inclination to be that we not risk that additional $2 billion.

But I have another risk that I want to talk about, where I have some great concern, and that is the risks that we will take if the planes do not conform to our design and manufacturing requirements, if the planes do not meet the performance requirements, and if there are material and workmanship defects in the plane.

We took something of a bath with the B-1. We can argue as to what it cost us. You used figures of $300 million or $400 million. I believe that figure more accurately is $1 billion to repair the ECM, where we ended up with the bill, instead of the contractor that did not produce an ECM which performed the way it was promised to perform.

We know there was a cost in the B-1, and I want to try to minimize the risks to the Government if the B-2 does not perform as warranted, or if the design and manufacturing requirements are not met.

We have done some work on this contract. We have tried to get the contracts. We have had some difficulty getting them, and we will need your cooperation over the next few days, frankly, to get the 1989 contract.

Is there a 1989 contract for the three production planes that were funded in fiscal year 1989? Is there a contract in existence?

General WELCH. What is the nature of that contract?

Senator LEVIN. Well, we have a contract that we have seen for the first five production planes that were funded before fiscal year 1989. My question is do we have, is there in existence, a contract with the contractor for the planes that were funded in fiscal year 1989? That is my question.

General WELCH. Certainly there is a form of contract. But if I go beyond that and try to describe that contract, I am immediately out of my depth. But I will be delighted to ensure that you have full information on that subject.

Senator LEVIN. Do you know whether or not the contract is a fixed price or a cost plus contract?

General WELCH. I don't know what the nature of that contract is for those three airplanes. No.

Senator LEVIN. Do you know whether or not the contract is a letter contract or not?

General WELCH. No, I don't know.

Senator LEVIN. What troubles us about the contract that we have seen, which is for the pre-1989 funded production planes, is that it caps the contractor liability at $100 million. This is troubling.

Do you know why it is that we agreed to cap the contractor liability at $100 million in that particular contract, which is the only one we have seen for those first five production planes?

General WELCH. I cannot answer to the $100 million, but I can tell you that the contractor's liability in this program is certainly far, far more than $100 million.

I am not a spokesman for the contractor. I am on the side that is involved in very, very difficult negotiations with the contractor.

I can tell you two things about those negotiations. They are the toughest and most protracted negotiations in my memory. Second, I believe that the contractor has probably more at risk on this program than most other programs, in terms of what the contractor has had to invest in this program out of contractor funds.

So I cannot answer to the $100 million, but I can certainly tell you the contractor's risk far, far exceeds anything like that number.

Senator LEVIN. Well, according to the contract we have, there is a cap for failure to conform to design and manufacturing requirements, and that cap is $100 million. There is also a cap for failure to meet performance requirements of $100 million. That is, I believe, a very severe restriction, which opens up great risk to the Government.

That is something that I would like to focus on with the Air Force in the next few days.

We had urged the Air Force to have the director of this program up here this morning. Apparently that person could not be made available.

We would ask that you make that person—I think it is Colonel Ferguson—am I correct?

General WELCH. Colonel Ferguson is at systems command headquarters—he is not the program director.

We have, for I think understandable reasons, felt very strongly that we must keep the program manager focused on———

Senator LEVIN. But he is the director of contracting for this program?

General WELCH. Yes.

Senator LEVIN. Is there any reason why he cannot be made available?

General WELCH. No, there is no reason why he can't.

Senator LEVIN. Okay.

Also, just to conclude this one point, there is also a 6-month limit on that warranty, which is also very restrictive.

So, just in conclusion, I have been one who has supported this program and not inclined to go along with this cut, this delay, which would create a gap, which would be very expensive in production. But I am also one who has been very deeply involved

trying to reduce the risk to the Government when contractors do not meet requirements in products that they deliver, and I am troubled by the $100 million cap and by the 6-month limit on the warranty.

In the next few days, I hope that Colonel Ferguson could be made available to us so that we could try to address that concern.

General WELCH. I would ensure that that happens, Senator.

Senator LEVIN. Thank you.

Senator EXON. Senator Levin, thank you very much.

I would ask staff to take due note of that. I think the Senator asks some good questions, and we will work with you, General, and your staff to get that information to the committee.

Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman.

General Welch, General Chain, I was curious. As Senator Wallop was talking, you suggested that if the B-2 were not funded, that would postpone START indefinitely, in your judgment. You almost, I think, lost a supporter for the B-2 program when you said that. So I think it is important that you not oversell the position on that. [Laughter.]

It was curious to me about the discussion on defensive systems being more expensive than offensive systems. Based on your testimony, it would seem to me that it would be in the Soviets' own interest if they were to agree to allow a B-1B or a B-52 or even a B-2 to be counted as one warhead even if it were loaded with ALCMs.

You have indicated that the ALCM is slower flying, perhaps less accurate because we would have to contend with mobile targets. So it would seem to be in their interest to have an ALCM-carrying bomber count as one warhead.

But, it seems to me, that clearly, what they want to do is to make sure that they are going to force us to go to a more expensive type of penetrator with the B-2. So I tend to think that Senator Wallop may be correct on that. But that is for another time.

Senator Warner, I think properly, asked you this question—I think it was to General Chain. He asked could any Soviet military leader assure his civilian leadership that they could survive a B-2 attack, to which you properly indicated no.

I would ask the same question: could any military leader assure his civilian leaders that they could survive an MX attack, or a D-5 attack, or an ALCM attack, including Stealth ALCMs?

Could they do that?

General WELCH. I think you make an excellent point, and that is that deterrence is not dependent on a single system. It is dependent on the triad, and you can't single out one piece of that and say that is the essence of deterrence.

The point of the B-2, not to give you a long answer——

Senator COHEN. I just did not want it to be conveyed that if we don't have the B-2, somehow the Soviets will feel more confident that they could survive what is remaining in the very capable deterrent program that we have right now.

General WELCH. I could not afford to leave it there, Senator Cohen, because what happens if we don't have the B-2 is we start

inevitably down the path of no bomber leg of the triad. This is not in 5 years; perhaps not in 10 years. But we are on that path.

Senator COHEN. No penetrating bomber.

General WELCH. That's right—no bomber force over time. That is the troublesome part about that.

I think all of us would agree that if we began down that path, we are starting down a path of enormously increased risk.

So this is not a 1989 decision to save some money. That would be a decision in the long run to allow the bomber leg of the triad to atrophy and to disappear.

Senator COHEN. You are assuming that would still involve the counting rule that we currently have if the B–2 were not to go forward.

Let me ask you, General Chain, this question.

You indicated the B–52G's, that you had to take them out of the SIOP.

As I understand it, they have been equipped with ALCMs and are still part of the SIOP. They are not out of the SIOP.

General CHAIN. You are half right, Senator.

We have two versions of the B–52G. One is the ALCM carrier; the other was the non-ALCM carrier.

The non-ALCM carriers had to go out of the SIOP. I had 150 B–52G's when I was talking on that chart about penetrating bombers. It is the nonpenetrators that are left as ALCM carriers. But all the penetrators are out, and they have all been dedicated to conventional-only missions.

Senator COHEN. This next is for either General Chain or General Welch. One of you made the statement that the bomber is the most stabilizing leg of the triad. That is revolutionary to me after hearing for so many years that the best contribution to stability would be to deploy the prompt, hard-target MX.

When did that occur, that the bomber force was the most stabilizing aspect of our triad?

General WELCH. That is the very basis for the START negotiating positions of both sides, to move from heavy reliance on ballistic missiles to increased reliance on the slow moving bombers.

The reason for that I think is very straight-forward. The bomber provides devastating retaliation, but cannot be viewed by anyone as a first strike capability.

So that does not mean that either side has a first strike capability. But the essence of the negotiating positions on both sides has been to move toward more stabilizing forces, which is the bomber leg of the triad.

Senator COHEN. Some have argued that to the extent that it is so Stealthy, that enhances or increases its first strike capability.

Wouldn't you agree?

General WELCH. Not at all.

Senator COHEN. It is not intended as that.

General WELCH. It is Stealthy in penetration. It is not Stealthy in launch, with the known locations of our bomber bases.

Senator COHEN. Presumably some of them would be launched on continuous flight in any event, would they not—some of them?

General WELCH. Only in the event of a very severe crisis, which would be well known by everyone.

Senator COHEN. One final question, if I might.

In a letter to Senator Exon, General Chain stated that the Air Force does not plan to make the B–1B a cruise missile launcher in the foreseeable future. It will maintain its role as a penetrator.

It seems to me this represents something of a significant change in the Air Force plans from just a year ago. In the fiscal year 1989 report to Congress, General Welch, you stated the following. You said, "Once the B–2 enters the inventory, the B–1B will begin the transition to a mixed role as a cruise missile carrier and penetrator."

This same statement has been made yearly, since the early 1980's.

I was wondering why the change—that you don't anticipate within the foreseeable future that it will be used as a penetrator?

General WELCH. Clearly that is in direct response to the START negotiations.

Senator COHEN. Are you saying as a result of the agreement in Reykjavik? Is that the reason for the change?

General WELCH. Certainly.

Senator COHEN. Well, I am curious about that, because we had Reykjavik back in 1986. That is when the agreement was reached. And yet, the Air Force has made the same statement since 1986, all the way through 1989, that the B–1 would be transitioned to an ALCM carrier, as opposed to strictly a penetrator.

We have known for several years what the counting rule from Reykjavik was going to be. I am wondering why the change this year from last year?

General WELCH. I will have to check the record. I can't imagine, because the START negotiating position, as formulated, was based on the B–1 as a penetrating bomber.

We had never planned to have the B–1 in the cruise missile role before the early 1990's. So, what we were talking about in earlier years was about that date.

Senator COHEN. The statement was "once the B–2 enters the inventory, the B–1B will begin the transition into a mixed role as a cruise missile carrier and penetrator," and that no longer is the case.

That was said in 1988. And here we are, in 1989, and the statement has changed. So it is going to be a penetrator.

General WELCH. I cannot explain the earlier statement.

Senator COHEN. It's only a year ago.

General WELCH. Be that as it may, the fact is that the B–1 remains capable of transitioning to cruise missiles when that seems to be in the best interest of the United States.

Our START negotiating positions and the agreements that we have approached so far with the Soviets make it clearly not in the best interests of the United States in that time period to equip the B–1 with cruise missiles. That is clearly our intent at this time, to not equip the B–1 with cruise missiles until we determine it is in the best interest of the United States. It is not at this time.

Senator COHEN. My time has expired. Thank you, Mr. Chairman.

Senator EXON. Thank you very much, Senator Cohen.

I am pleased to welcome my colleague and great co-worker on the Strategic Subcommittee at this time.

I will tell you, Senator Thurmond, that your opening statement has already been entered into the record.

Senator THURMOND. Yes, I understand that. Thank you.

Senator EXON. So I am pleased now to recognize Senator Thurmond.

Senator THURMOND. Thank you very much, Mr. Chairman.

General Chain, the Secretary of Defense said recently that about 60 percent of the B–2 targets will be fixed targets.

Will you explain why you need the bomber for these targets, instead of cruise missiles?

General CHAIN. The advantage of a cruise missile is that we can carry a number of them on an aircraft. The targets that they are going after can be preloaded into the weapon before it takes off, and once it is launched, it has a high probability of getting to the target.

The bomber, on the other hand, when it comes into a target area, it looks to see whether the target has already been struck by the cruise missile, if it happened to have been a cruise missile target, or whether it has been struck by an ICBM or an SLBM if it happened to have been one of those targets, and is able to hold at risk the targets that have been already attacked by another weapon system.

Senator THURMOND. Mr. Hinds, you are with the Northrop Corporation now, though I believe you were Air Force.

Is that correct?

Mr. HINDS. That's correct, Senator.

Senator THURMOND. How long were you in the Air Force?

Mr. HINDS. For 21 years.

Senator THURMOND. The committee has heard a great deal about the designing features of the B–2. One feature often discussed is the absence of a vertical tail and the resulting effects on lateral and directional stability.

Would you please describe your perception of the flying qualities during the first flight?

Mr. HINDS. Yes, Senator.

I did describe the first flight scenario that we went through.

The B–2 uses drag rudders, instead of a conventional vertical surface and rudder, for directional stability.

The wingspan of the aircraft is 172 feet. These drag rudders are located on the far extremities of the wing. So they provide a restoring moment for directional stability.

The maneuvers that we did during first flight to test out the characteristics of the directional stability or the yaw stability of the airplane, were rudder kicks, where we would kick in the rudder and see how fast the airplane would restore to its previous flight path. The aircraft performed very well. With the rudder kicks that we put in, there was one overshoot, where the nose would swing over once and then go back on its original course.

The other maneuver that we did to test it out would be roll maneuvers, where the coordination, where the rudders, the drag rudders, coordinate the turn to keep the side slip under control.

We did quarter stick, half stick, and three-quarter stick roll maneuvers. In all those maneuvers, I did the maneuvers feet on the floor. So the flight control system put in the active rudder and,

again, the yaw was well behaved, as predicted from our simulation, and very well controlled.

We saw no problems in the directional stability from the airplane.

Senator THURMOND. Colonel Couch, one of the concerns we have about the B-2 is that the integration of so many newly designed subsystems would be very difficult.

Did your flight experience any particular failures in any of these? If so, were they major or minor?

Colonel COUCH. The subsystems in the airplane performed, I hate to use the world "flawlessly," but it's about as close as I can get on first flight.

We performed about 2 hours' worth of test work on a first flight for an airplane, and essentially landed the airplane with no maintenance problems on the aircraft.

Theoretically, we could have turned the airplane to fly the next day.

I think it is probably a first for a first flight on an airplane, to have the systems work that well on a first flight. But the process of development of the subsystems in the different laboratories that support the B-2 have, in fact, supported the effort of integration of those subsystems together and allowed us to fly the airplane and to have the airplane fly as well as it did.

Senator THURMOND. General Chain, I know the Air Force wants this plane badly, because they have said so. They have testified so. I always try to cooperate with the different services and back them up all I can.

I believe in a strong defense. I think it is the only way to keep this country free.

The thing that is disturbing the American people, from the correspondence that I get, is the high cost of this plane.

Is it worth the cost in the first place?

Next, could that money be used better to purchase other equipment to protect our freedom?

General CHAIN. The answers are "yes" to the first and "no" to the second.

Yes, it is worth the cost, and it has been factored into the Defense budget now and through the out years. It has gone through scrutinous review, and we, in the Defense Department, obviously look very hard at what are the tradeoffs and can we do something cheaper because we know that dollars are not infinite.

So yes, it is worth the cost. And no, we don't have anything else that we can do that job with.

Senator THURMOND. If you were starting from scratch, today, to make a decision to buy this plane or put that same amount of money into something else, what would be your choice?

General CHAIN. I'd buy the B-2 aircraft.

Senator THURMOND. You'd buy this plane?

General CHAIN. Yes, sir.

Senator THURMOND. General Welch, I know you are very interested in it. I have heard you express yourself.

Are you still of the opinion that it is a wise thing for the American people to put all of this money into this one plane?

General WELCH. I certainly do, Senator.

As you well know, we have made very, very difficult tradeoffs over the past 5 years with a steadily declining Defense budget. And in each of those years, all of these high cost programs have been scrutinized.

If we could find a lower cost approach to doing this job, we would certainly embrace it. We simply cannot. There is simply no alternative.

Senator THURMOND. In a briefing you gave us some time ago, you mentioned that since we have spent all this money on the research, development, and so forth, it would be cheaper to go on through with this contract and purchase these planes than to cancel it.

Are you still of that opinion?

General WELCH. I know of no lower cost way to provide the capability.

Senator THURMOND. You still feel it is the best buy and that it is to the advantage of the American people that we go forward with this contract, and it would be somewhat cheaper than if we canceled it? Is that correct?

General WELCH. I certainly agree that it is in the best interest of the American people to go forward and to field the B–2.

I wouldn't say you can't save money by canceling the B–2. But we do so at a great increase in risk to the American people.

Senator THURMOND. Thank you, Mr. Chairman.

Senator EXON. Senator Thurmond, thank you very much.

Senator Wirth.

Senator WIRTH. Thank you very much, Mr. Chairman.

Gentlemen, thank you very much for being here, and congratulations, Mr. Hinds and Colonel Couch.

I wanted to go back, if I might, briefly, General Welch and General Chain, to the linkage that you were discussing earlier between the START Treaty and the B–2 bomber.

Could you define for us very briefly what that linkage is?

General WELCH. At the outset, there was a perception, there was a conviction on both sides that we increase stability and therefore make the world a safer place if we can move away from the rapid response ballistic missile approach more toward heavier reliance on the slower flying, penetrating, manned bomber.

That conviction underlies the Reykjavik agreement and that conviction underlies the direction that we have been going on START negotiations from the beginning, that we wanted to reduce the total number of ballistic missile warheads.

We are particularly interested in reducing the large numbers of Soviet ballistic missile warheads. So, this was the underlying basis.

Senator WIRTH. I don't think anybody disagrees with that. Most of the American public wants to reduce the number of warheads. It's the relationship between the goal of reduction and the B–2 that I think is of concern to us this morning.

Is it the case that if the Congress were to say don't build the B–2 bomber the Air Force and the Pentagon would come back and say we ought to reconsider START?

General WELCH. I think it very definitely is the case that——

Senator WIRTH. Is that true?

General WELCH. Yes. If we start down that path——

Senator WIRTH. If we don't spend $500 million per airplane, if we don't build the B-2 bomber, you all will come back and tell us and tell the American public that you will reconsider and no longer support the START agreement?

Is that the policy of the Air Force?

General WELCH. I don't think that such a stark statement expresses the proper relationship.

The fact is that the current START negotiating position depends very heavily on the penetrating bomber. If the penetrating bomber or the expectation of penetrating bombers is removed, then we must reformulate the START negotiating position. I don't know what that would be. I don't know how long that would take.

I can tell you we cannot stay with the current START negotiating position without the expectation of a significant capability for manned penetrating bombers.

Yes, that is true.

Senator WIRTH. It is the case.

Now, if Mr. Hinds' B-2 flight had not been successful, or say there had been a delay for another year, would that have meant that our START negotiations would have been delayed for another year?

General WELCH. Oh, I can't say that. As long as there was the expectation that our end position—after all, START negotiations do not produce changes in 1 year. Regardless of how rapidly we negotiate the START agreement, there will be a number of years for enactment of the START agreement provisions.

So I can't say that it's dependent on what happens this year.

Senator WIRTH. So we are backing off a bit from the direct correlation between building the B-2 and support for START, is that right?

General WELCH. No, I am not.

I am saying——

Senator WIRTH. There is still a direct correlation? If we don't build the B-2, you all will not support START, is that correct?

General WELCH. If we do not have the penetrating capability of the B-2, we must reformulate our START negotiating position.

I did not say I do not support START negotiations without the B-2. I say to you I don't know what the form of those negotiations would be, I don't know what the position would be. I do know we would have to reformulate that position and virtually start over.

Senator WIRTH. When we put the START proposal on the table, 2 years ago, we did not know whether or not the B-2 was going to work.

General WELCH. We certified to the sufficiency, the military sufficiency, of the START negotiating position that we put on the table. We assumed strategic modernization, and we made it crystal clear to everyone when we certified to that military sufficiency that we were assuming the strategic modernization of all three legs of the triad. That is not a new position. That was explicitly and clearly stated at the time we made our position.

Senator WIRTH. Let's get directly to the statement this morning of the quite specific correlation between the B-2 and the START Treaty.

I think we have to understand whether or not there is a direct correlation between the B–2 and START. What really bothers me, General Welch, is the last few days of congressional decision on the B–2, we have the potential of the Air Force saying to the American public effectively if you don't support the B–2, we're not going to support arms control.

I think that that is a very heavy poker game for the Air Force to be playing.

Maybe I have misunderstood the position of the Air Force. Maybe I have misunderstood the position that you and General Chain were suggesting this morning. But I think we have to be very, very careful. I think we have to be very careful and the relationship of the B–2 to a START, and I think you all have to be very careful in how you describe the importance of B–2 to START.

For example, if we put this proposal on the table not knowing whether the B–2 were to work, do we now put a lot more on the table in the START negotiation now that we know it may work? If we decide to go ahead and fund the B–2 at 132 aircraft, does that mean that we are willing to do more in terms of negotiations with the Soviets? If the Congress decides only to fund 66 or 50 or 40 B–2s, does that mean that we withdraw some of the proposals from START?

I think there is a kind of glibness on the relationship here between B–2 and START that you all ought to be very, very careful of. Maybe I could leave the record open and you could provide us with your analysis on how and why the B–2 directly affects START and how you justify what I understood was your earlier suggestion, that without the B–2, you all would be reappraising your support for START.

General WELCH. That remains the case.

You may leave the record open, but I would not want to leave the record uncertain at this point in time.

In the first place, this is not something that has sprung on the scene in the last few days. This program has been in being for 10 years.

Furthermore, when we formulated our START negotiating position, it was clearly on the basis of a strategic modernization program, which was, at that time—at that time—approved by the U.S. Congress.

So this is not a matter of having invented an unrealistic expectation, given that we are 10 years into this program.

Senator WIRTH. I understand you are 10 years into it.

General WELCH. So, what I am saying is that without the B–2, there is a fundamental change in the military sufficiency of the forces, and we would have to reformulate the position. This means we would virtually have to start over with formulating that position.

I think we have been very careful in the way we have said that, and we are not playing a high stakes poker game; but nor are we willing to allow anyone to not face up to the consequences of that decision.

General CHAIN. Let me make a comment, if I may.

Senator WIRTH. In other words, if Congress doesn't fund the B–2, the chances are that you are not going to support a START agree-

ment. That's what I hear you saying, General Welch, and I think that that is, again, a very high stakes and politically dangerous poker game.

My time has expired, Mr. Chairman.

Senator EXON. Thank you very much, Senator.

Let me advise you how I feel about the line of questioning that you have just followed.

It is not only a very high stakes poker game, but it is the only game in town.

I get a little worried from time to time that people want to have arms reductions. But when you come up with a program like the B–2, which guarantees arms reduction better than anything else we have ever come up with, it is questioned. It is nickled and dimed.

I would advise all that at a breakfast meeting this morning, it is just not General Chain's and General Welch's statements, it was the statement of the Secretary of Defense, and I asked him if I could make that statement today, and he said I could.

It is also the position of the Chairman of the Joint Chiefs of Staff, who was at that breakfast meeting.

The point that we have to understand is that under the present scenario with regard to START, it is not going to work unless we have the B–2.

Now, that doesn't mean that if we don't have the B–2, we might not start all over again on some kind of START. But I think what these gentlemen are saying, what the administration is saying, and what a number of us are saying is that under the present scenario, we, I could not vote for START—under the present scenario and numbers—unless we have the B–2.

With that, General Chain.

General CHAIN. I resent the implication that this is a pop-up position.

If you look to your left, Senator, you will see Senator Exon, Senator Warner, and the other members of the committee.

I have been CINCSAC for 3 years now. I have testified every year, and I have held the same position for the past 3 years.

This was not something crafted today for the public. This is something that has been a fundamental position of the Commander-in-Chief of Strategic Air Command since the day I took over.

Senator WIRTH. Then, if in fact, that is the case, General Chain, we should all know that very, very clearly. If that is the case, the Congress should know that if we don't fund the B–2, we're not going to get a START Treaty. That's what we're hearing.

If that is the case, then that particular statement ought to be put out on the table loud and clear.

General CHAIN. The statement has been made public by me for the last 3 years. It's incorporated in just about every speech that I make that includes talk about the B–2 and strategic modernization.

Senator WIRTH. Then that should be part of the debate and part of the discussion; that if the issue is if we don't, as we have gotten right down to it now in the last 5 minutes, if we don't get the B–2, we're not going to get a START agreement.

Senator EXON. Senator Wirth, let me tell you that I thank you for bringing this up once again. We went into it at the breakfast

meeting this morning. We have been into it earlier. You are so right and I am delighted that you brought it up.

I think it should be very clear, and if it has not been clear before, it should be made clear after this important hearing this morning.

Indeed, it is not a high stakes poker game. Indeed, the situation is such that, unless we would go back and change significantly the START position that we are presently considering, we would have to have the B–2. I think that is the bottom line.

Now, people can argue with that if they want. You can argue that is not necessary. But I think that is the position of the administration and that is the position of some of us who also recognize that there are legitimate questions with regard to the B–2.

But you have, Senator Wirth, focused on a very important matter, and, above everything else, I think that is a matter that probably has not been highlighted enough or fully understood.

Senator WARNER. May I have just a word in that, because I think this is the crux of it.

It's not that we will not get a START Treaty. But it is that our negotiators would have to get a different set of instructions, predicated on a change in the projections of our military deterrence capability by this program being canceled by the Congress.

So we might well get a START agreement, but that agreement would be substantially different and perhaps not as beneficial to both the Soviet Union, the United States, and the rest of the world as the one that is currently on the table.

I believe that is what I feel is the case.

Senator EXON. Thank you, Senator Warner.

We will now begin our second round of questioning, and we will follow the same procedure, for the information of the committee.

Let me start out by asking either General Welch, General Chain or both a question that Senator Glenn asked that I do not believe was fully answered.

Senator Glenn, in his opening question, raised an issue that I don't think was adequately answered.

As I heard him, he argued that the Block One flight test program is of no help in determining whether or not the B–2 will be able to carry out any operational mission. That is not the understanding that I have from my briefings of the Block One test.

Could you tell us what you think we will learn from the Block One test?

General WELCH. Let me start, and then I will ask Colonel Couch to comment on that since he is the one that has to carry out a good bit of that.

I think, like all such statements, there is a grain of truth in it. That is, Block One is not designed to complete the testing of the weapon system.

Block One is primarily aimed at the air worthiness of the basic machine. It is the basic flying qualities. It is the interface between the propulsion system and the airframe. That is the purpose of Block One.

Beyond Block One are all the testing of the integration of the weapon systems, et cetera. But the point is that the fundamental

kinds of risks that were described by Senator Glenn had to do with the flying qualities of the airplane.

He questioned its yaw stability. He questioned its pitch stability. Those kinds of things are indeed deeply explored in Block One.

So they will answer the question of whether or not there are any fundamental problems that would require any fundamental retrofits in the basic machine as it rolls out the door. That is my perception of Block One and that is all the details I know.

Certainly Colonel Couch can talk about that until you are tired of listening.

Senator EXON. Thank you.

Colonel.

Colonel COUCH. General Welch has pretty much explained what we will do in Block One.

Flight test is a science and not an art, although sometimes we have to change our approach to things as we go through a flight test program.

But we essentially do flight test in building blocks. We have taken the first step in that process on the first flight, and shortly we'll take the second step. Over the 14 flights, we hope to take enough steps to have opened up the primary flight envelope for the airplane and understand basic propulsion, basic stability and control, and have some clues as to how well this airplane will perform.

Senator EXON. I suppose we have not done enough to explain what at least I understand on this first flight test.

Is it not true that with the flight test that you and Mr. Hinds performed last week, isn't it the first time in the development of military aircraft that we have had a flight test of an initial production run aircraft?

Since this aircraft has been so long in development between the materials used and the machine tools used to produce this aircraft and because of its revolutionary design, this necessitated us to take a different approach. Therefore, the first flight of this particular aircraft is more significant as far as its future promise is concerned than the first flight might be for another aircraft. Is that a generally accurate statement?

Colonel COUCH. I think it might be fair to say that the approach that has been taken up to this time in both the building of this airplane and the building of the systems that are in this airplane is a radically different approach than we have taken in the past.

For every major element of this airplane, there is a laboratory that supports the subsystems that are involved. For instance, there is an environmental control system lab that has the full-up environmental control system in the airplane.

There was a propulsion lab that we call the auxiliary power intergration test facility, that had an engine and the whole power train for the airplane.

Each of those pieces came together in this airplane in production tooling in the building of the aircraft. I think that, over the course of the last 3 or 4 weeks, we have seen the fruits that are to be paid by the initial investments in those laboratories.

We essentially went from the beginning of the taxi test in this airplane to first flight with one minor problem, and that minor problem turned out to be something that was akin to the lint you

find in your belly button, in that it stuffed up or clogged up some heat exchangers in the airplane.

Other than that, we have not seen any problems with this airplane, and actually landed after a first flight without any significant maintenance problems with the aircraft.

Senator EXON. Thank you.

General Welch or General Chain, as you know, there are some who characterize the B–2 as a first strike weapon, apparently assuming that it is invisible to long-range radar.

Let me ask you this question, gentlemen.

Do you expect the B–2 to be invisible to, for example, OTH–B radars, or, as I heard on a lengthy Nightline Show last week, that it would be easily detectable by the Soviet Union on so-called pulse radar?

General WELCH. We have been through a series of so-called solutions to detecting Stealth aircraft. We have been through cosmic rays. We have been through impulse radars. We have found no solutions to doing that.

However, the issue of whether or not a Stealthy airplane can stealthily launch a first strike is a totally different issue.

In testifying before the House, I said, and I was not joking, that when we begin to generate the bomber force, if we were to begin to launch the bomber force, we would see that on CNN.

The fact is that our bomber locations are known. The decisions that are made that lead to their generation are not secret. Those activities are visible to the public, standing on public highways.

The point is there is no possibility of generating any kind of large-scale bomber attack from this country and keeping that secret.

So the fact that the Soviets would not be able to actually track the airplane in route, that is the idea of the Stealth bomber. But that is a long way from imagining that it would be possible in this country to generate and launch a stealthy bomber attack.

Senator EXON. A secret strike?

General WELCH. A secret strike. You might do that with two or three airplanes against Libya. But you certainly are not going to do that with a strategic nuclear strike force against the Soviet Union.

Senator EXON. Or, could we say, General, that through a variety of sources and some radar, there may be some indication, at least from a large force, that something was going on? That is far different than being able to detect and track, and, therefore, launch an attack, a successful attack against such aircraft?

General WELCH. You are quite right. It is stealthy in penetration. It is not stealthy in launch.

Senator EXON. Thank you, gentlemen. My time is up.

Senator Warner.

Senator WARNER. Thank you very much.

I would like to just summarize how I feel we are making some progress, at long last, in trying to help the public understand the situation.

I am particularly troubled by the House of Representatives. I say that with no great disrespect.

Senator COHEN. Is that a general statement?

Senator WARNER. That's a general statement.

Senator NUNN. In general?

Senator WARNER. Well, I'm going to make it specific. [Laughter.]

You know, what has happened here is that for 10 years, the two military committees have had the responsibility to make decisions and backed up three Presidents. We have done that.

I have gone back to check this here within the last hour. Basically, the facts that the Department of the Air Force have given us are consistent. I don't think that we can point our fingers and say that you have been ducking the questions. We have had the right to ask the toughest of questions. You have shared all the information.

But what has changed is when this plane rolled out, so did the facts roll out, and now some people can't take the heat. They are ducking under the table. They are talking about canceling and stretchout.

We should have been doing that in the past 10 years and not now.

So, the bottom line is that the Congress cannot take the heat as the facts are being learned by the public.

It seems to me our responsibility, once again, is, just as we have supported our Presidents for 10 years, and supported the Air Force for 10 years, we have an obligation to inform and educate the general public, so that we can gain their support and move this program forward.

I think this hearing has been a major step forward in that direction.

We talk about the expense of this aircraft. Indeed, it is expensive. I draw on my own limited knowledge.

When I was a young sailor in World War II, airplanes were $20,000 a copy, I believe.

Isn't that about it, General?

General WELCH. [Nods affirmatively.]

Senator WARNER. Then I say to the person who says this is too expensive: you point to me what is the cost if deterrence fails and that first strike is launched.

I come back to General Chain's response to my question, on which Senator Cohen amplified, what is in the mind of the Soviet planner. As you and General Welch pointed out, it is not just this program. It is the land base, it is the submarine based, it is our standoff systems.

But I do believe that this B–2 is the largest question mark in the mind of the Soviet planner.

Am I correct on that, gentlemen?

General WELCH. I would agree with that. It has the most versatility, it has the most flexibility, it can cover the widest range of targets, and he has the least capability to deal with it.

Senator WARNER. And if the Soviet Union determines they want to deal with it in terms of air defenses, it is a multiple—at least three to four times—of the cost of this bomber, in terms of their ability, if technically they can achieve it, to put up some defense system.

Am I not correct in that?

General WELCH. We don't know how to do that.

Historically, it costs three or four times, or more.

You know, it is interesting to point out, Senator Warner, that this country has made the decision that it is not cost effective to defend against manned bombers. This is not because we are not worried about manned bombers, but because we accept the fact, after a careful analysis, that the cost of defending against them is so much greater than the cost of offensive deterrence that we have elected not to make the investment in defense against manned bombers.

The Soviets did not make that decision—perhaps because of their World War II experiences, perhaps because the Soviet Union has been devastated a number of times by attacks. The Soviets made the commitment to defenses, to try to defend against manned bombers. They have invested far, far more in that than we have found it necessary to invest in countering their capability to do that.

I see nothing that would change that historical relationship.

Senator WARNER. And we might add, General, that the Soviet Union is rapidly moving toward strengthening its bomber leg.

Am I not correct?

General WELCH. That is true.

Senator WARNER. And they are in production with the Bear series, the Blackjack series of aircraft, all of which have the capability of reaching the United States today.

General WELCH. The Bear and the Blackjack, yes, sir.

Senator WARNER. Correct.

So, to the extent that we can provide deterrence with the entire spectrum of the triad, it is less likely that they would send those bombers against the United States.

We are fortunate on our staff to have a test pilot, and he prepared this question. I would like to ask it of Colonel Couch.

The roll rate produced on this flight was up to 18 degrees per second. This was with only three-quarters of the stick deflection, not full, and with gear down, slow.

It would be good to get a comment from Colonel Couch or Mr. Hinds on the following: how did this feel?

There are a lot of aviators watching this program. Share it with them.

Mr. HINDS. Senator, it felt better than sitting here. [Laughter.]

Colonel COUCH. I concur.

Mr. HINDS. It was very nice. It is a very responsive aircraft.

Senator COHEN. You haven't had much yaw here. [Laughter.]

Senator WARNER. But the flak has been pretty heavy, hasn't it? [Laughter.]

You have flown for how many years now?

Mr. HINDS. I have been a test pilot for 22 years. So it's most of my adult life that I have been in the test business. I have been a pilot for 28 years.

Senator WARNER. Colonel Couch, how did it feel?

Colonel COUCH. It was very smooth. That's probably the best way to describe it. I think most people think of high roll rates as being uncomfortable. We were initially concerned about the yaw that would be generated when we put in those control inputs. We had seen in the simulator that there was no reason to be concerned,

and we found that the airplane, in fact, did not generate yaw when we were generating fairly significant roll rates.

Senator WARNER. One last, quick question.

General Welch, you have been in aviation for close to 40 years now, I think. Have you not?

General WELCH. Yes, sir.

Senator WARNER. Now we are celebrating this week the landing on the moon, which was an enormous step forward in space. We cannot quantify this in terms of fixed wing advancement, but wouldn't you say it is comparable in terms of an extraordinary achievement for the United States of America in fixed wing aircraft to have gotten this plane designed, built, and flown?

General WELCH. I would say that bringing together Stealth technology in a highly efficient, aerodynamically efficient aircraft, with the kind of handling qualities and the maneuverability and capability we have in this aircraft is clearly a revolutionary capability. There is no other description for it.

Senator WARNER. Is there any other nation anywhere near it, in terms of technical breakthrough?

General WELCH. I know of no such indication.

Senator WARNER. I thank the Chair.

Senator EXON. Thank you, Senator Warner.

Senator Kennedy.

Senator KENNEDY. Thank you very much, Mr. Chairman. I understand that earlier in the course of the hearing there was some review by you, General, and Senator Wirth, about the START, the implications of START, on the advantages of the B–2.

In looking over the numbers with the B–2, we have the President's position that START, as I understand it, is some 6,000, and with the B–2 bomber we go up to actually 9,000 warheads.

Is that correct?

General WELCH. Those are ballpark, for unclassified discussion. Yes, sir.

Senator KENNEDY. They are ballpark.

Could you perhaps elaborate about what the real distinction is between 9,000 and the 6,000, or if we perhaps had a reduced force, somewhat about 7,000 or 8,000 warheads? What is the real nature of the threat in terms of our security with any kind of variation between those numbers?

General WELCH. I think the best way to address that, Senator Kennedy, is to very briefly start from how we formulated our START negotiation position and how the Joint Chiefs arrived at our certification as to the military sufficiency of that negotiating position.

As you know, an underlying thesis has been to reduce the numbers of the threatening fast flyers and instead to move to more stabilizing bomber forces as the means of providing adequate deterrence.

When we formulated the positions, the military sufficiency was based on a very significant contribution by manned penetrating bombers. The Reykjavik counting rule was the result of the conviction that it is a desirable thing to do and the Reykjavik counting rule which allows us to do that with manned penetrating bombers is an integral part of the sufficiency of the remaining force.

So, the fact is that, of course, if the manned penetrating bomber does not make the expected contribution, then we have to reassess the positions and reassess the military sufficiency.

It is not possible, in my view, for anyone to define a sharp cutoff that says if you have this number, that then is sufficient, and if you have 100 less, then that is not sufficient.

But we are talking about very significant numbers of added deterrent weapons because of the manned penetrating bomber and the Reykjavik counting rule. Without it, we do not have a militarily sufficient force, in my estimation.

Senator KENNEDY. I am just trying to understand it. When the President talked about 6,000 weapons, what he did not say in terms of us understanding the situation correctly, then, he was saying that you are going to have to get somewhere above 6,000 in order to achieve the security interest of the country.

But he is basically saying that he didn't really mean 6,000, but was actually talking above that number.

General WELCH. Well, 6,000, of course, always referred to ballistic missile and cruise missile warheads. I would certainly be the first to agree that in discussions in the media, et cetera, there has been a tendency to shorten that statement too much and say just "6,000."

But it was always 6,000 ballistic missile and cruise missile warheads.

Senator KENNEDY. So, 6,000 really is in terms of warheads. It is not representative. It is somewhat above that.

General WELCH. That is correct.

Senator KENNEDY. Did you earlier in the hearing provide the life cycle costs?

I know when we consider the various missiles, we consider in terms of the cost what the life cycle costs are. I was wondering if you provided for the committee what the life cycle costs on the B–2 are?

General WELCH. I could do that. I don't have it. But all the comparisons that we have given you are apples and apples acquisition costs.

But I can provide life cycle costs for all of those systems.

[The information follows:]

B–2

O&M cost for the B–2 are projected to be $34.5B in fiscal year 1989 for a 25-year period beginning with first operational delivery.

Senator KENNEDY. Could you give us any ballpark figures?

General WELCH. I don't have them with me.

Senator KENNEDY. Do you know whether these are more than the missiles.

General WELCH. Certainly. The life cycle costs, I can tell you generally the order. Life cycle costs for manned bombers and ballistic missile submarines are always far higher than for ICBMs, simply because manned bombers and ballistic missile submarines have to operate and train with crews. You have to train fairly extensive crews. That is far more expensive than the cost of maintaining

ICBM's, which require very little maintenance and very small crews.

So life cycle costs for manned bombers are considerably higher than life cycle costs for ICBM's.

Senator KENNEDY. Are we talking about 8 to 10 times higher?

General WELCH. I wouldn't be surprised. But let me get you the accurate number.

Senator KENNEDY. Thank you.

My time is up, Mr. Chairman.

Senator EXON. Thank you, Senator Kennedy.

Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman.

Senator Warner unfortunately had to leave, but he asked the question about what is in the mind of the Soviet planner. That is always intriguing to all of us.

The question I have is this. If the B–2 poses such a significant problem for the Soviet military planner, then why would a Viktor Karpov or a General Akhromeyev not look at the B–2 and say: "Wait a minute. It's going to cost us $350 billion to defend against the B–2. The B–2 is going to be able to hunt down my mobiles. It's going to take out any remaining missiles that they may have missed with the ICBM force. It is going to bomb any silos that I may have set aside for reloading. So why not promote something less threatening to us? Why not promote standoff cruise missile capability, which will not have the same capability, will not have the same intelligence, will not have the same information for targeting purposes. It may be less accurate and will not be able to deal with the mobiles. Why not encourage that by saying let's count the B–1 with ALCMs or the B–2 with ALCMs as one warhead?"

What would go on in the Soviet mind? If the B–2 is such a threat, why would he encourage us to build it or to deploy it?

General WELCH. Well, certainly, none of us can accurately predict what is in the Soviet mind.

Senator COHEN. Well, you pretend that you are a Soviet planner.

General WELCH. Yes, sir. But that is a very dangerous situation. I don't know if I can think like a Soviet.

But there is a fellow over there testifying before the House right now who does much better at that. [Laughter.]

Senator COHEN. Apparently, he's not doing so well over there. We'll have to bring him back over here.

General WELCH. That's good news. [Laughter.]

Let me say that I think one of the central concerns on both sides was the threat of very rapid escalation from fast flying ballistic missiles; the threat that some incident or some small exchange, for whatever reasons you or I cannot imagine, would very rapidly escalate into a holocaust.

Clearly, the manned bomber, whether it be a cruise missile carrier or a penetrating bomber, greatly reduces the threat of that and, therefore, seems to be a safer approach.

Now I have to confess to you that I am somewhat puzzled about attitudes toward cruise missiles. This is because we don't agree with the Soviets that cruise missiles have the same characteristic as ballistic missiles.

Our negotiating position is that, while we will count cruise missiles as more than one, we think we ought to have a discount rule. So that clearly represents a difference of opinion about the escalatory, threatening nature of cruise missiles.

Senator COHEN. They see the cruise missile as an equal threat as a gravity bomb or an ICBM?

General WELCH. Their position would indicate that the cruise missile is as threatening as an ICBM. Our feeling is that that is not the case. That is the reason for the difference in our negotiating position.

Senator COHEN. General, if we were to ban mobile ICBMs or mobile MIRVed ICBMs, does that lessen or reduce the need to rely upon a penetrating bomber?

General WELCH. That is a two-edged sword, obviously.

I think, again, if there were no mobile missiles, then the task of covering the target base is easier. On the other hand, we are not counting on being terribly efficient at covering mobile missiles.

But, more important than that, is I believe and I think most military thinkers believe that mobile missiles are stabilizing, compared to silo based missiles.

So, in spite of the fact that mobile missiles in possession of the Soviets——

Senator COHEN. I'm sorry. Do you believe that?

General WELCH. I believe that.

Senator COHEN. But our negotiating position is that we want to ban them.

General WELCH. The negotiating position is that until such time as we agree on a verification scheme for mobile missiles, we will maintain our position that they ought to be banned until we can work out a verification scheme.

Let me also add that the United States has offered a deployment mode and a deployment scheme that we believe is verifiable. So it is a matter of getting the Soviets to agree to a deployment approach that is verifiable.

Senator COHEN. I would just come back to the question of cost.

Secretary Cheney stated that the $70.2 billion acquisition cost is based on three key assumptions, including achievement of "planned cost reduction initiatives," which, according to the Secretary, are intended to save some $3.6 billion.

What are those planned cost reduction initiatives?

General WELCH. I would have to get you an entire list of those. There are several of them, of which about half are already on contract, and about half are future.

[The information follows:]

B-2

The CRIs are under continuous review. The following are the current CRIs:

Automated Lay-Up	Drivematic Enhancements
Automated Resin/Adhesive	Fiberglass Edge Bands
Delete Non-Destructive Test	Optimize Machine Parts
Automated Plycutting	Reduce Rec of Material
C-Channel Compaction	Warp Fill
I-Beam Cap Mechanization	Change Urethane IFE
Advanced Multi-Processor	Lightning Strike Fuel Tank
Conversion of Fiberglass Bk	MDEU Replacement/Optical Disk

Assembly Planning Process
Integrated Database
Soft Tooling
Automated Hole Inspection
Computer Inte Manufacturing
Delete DMS Antenna
Tailpipe Improvements
Automation Hot Forming Cell
Maj Assmb Plan and Control
Robotic Abrasive Water Jet
Proc Control for Composites
97.5 Rib Upper Chord
Coating Thickness Measurement
Consol Program Data Function
Declass 734 UVE PROM & SAR
Elim Limited Dist Caveat
Elim Safelock Motor Circuit
Elim OBS Shipping Panel
Long Length Comp Angle Fab
Automated Pre-Preg Reconstruction
Core Development Program
Automated Deburring System
Redesign 1QA Rib
I-Beam Co-Cure
Machining Robotic T&D
Aft Deck Forming Improvement
Deletion of X280 Rib Access Panel
Eliminate Stiffened Blade Inspect
One-Time Paint Touch-up
Reduce Autoclave Inspect
Relax NDI Requirement
Nav Sub-System
Eliminate Side Window Heater
Major Assembly Splice
ZSR-67 Combined Upgrade Process
IAC Ops Planning and Control
Manufacturing Visibility Center
Sim/Analysis for Ops Procedures
Hyper Spray
Computer Generated Illustrations
Flight Control Computer Upgrades
Honeycomb Block Dip/Cure
Inte System for Managing Changes
New Tech Bond Fixture
Robotic for Major Assembly
Factory Automation
Bagging Material Waste
Composite Info Management System
Deaccess Landing Gear Test Site
Delete Bay Door Hinge Redesign
Elim Escort Reqt for C/SAR Over-Rd
Elim AS Dielectric Testing
Grommet Lengths-Cove Panel
Polycrystalline Drill Bit
Pooled Procurement
Reduce Acceptance Pin Test
Reduce Material Testing
Reduction In Silver Wire Test
Supplier Data Sheets Delivery
Tool Improvements
Discontinue ECV RDOF
Reduce Prop SDRL for LPO
Management Enhancement
Reduce Honeycomb/Elevon
Sheet Metal Cell
Quality Engineering Reduction
Reduce Hydraulic System
Reduce Runs to 256A/P1OA
Rotobin Standards
Tool Routing
Teleconferencing Network
Reduce FSD SDRL Reg
Radar Antenna Producibility Improve
Reduce Surveillance (LTV)
Combined Val/Ver of Tech Orders
Pooled Procurement (NB2D)

General WELCH. Let me say about the cost estimate that no one can ever guarantee that cost estimates for the next several years are going to be exactly accurate. What I can guarantee you is that there is certainly no excessive optimism in those cost estimates, and that it is absolutely the most professional job that I have ever seen on addressing cost estimates.

Senator COHEN. A question was asked before about life cycle costs.

Mr. Jack Welch is here, and he probably has some information that he might provide regarding this.

According to the CBO, the Air Force Costs and Planning Factors would indicate that the annual operating and support costs for a B-2 would be roughly $8 million per year per plane.

Mr. Welch, is that accurate?

Mr. WELCH. I cannot testify to the accuracy. We do not have the numbers here.

I would say, just as General Welch said, there is a multiple there. But I don't believe we have run those numbers out in comparison to the GAO.

Senator COHEN. Would you be in a position to analyze what the CBO has produced for the Congress in terms of their estimates for operating and support costs? I think that works out to roughly

about $1 billion—if you have 132 aircraft, to roughly $1 billion a year for the O&S account.

Mr. WELCH. We could certainly supply that.

Senator COHEN. Thank you very much.

[The information follows:]

B-2

The average annual Operating and Support (O&S) for a B-2 wing in fiscal year 1981 base year dollars is $223.3M. The following are the assumptions used: The concept of operation uses a wing of 30 aircraft with each bomber flying 431 hours per year. The costs are the direct costs to support the primary personnel and to operate the aircraft, and the indirect cost of the associated Base Operating Support (BOS) personnel, their acquisition, and training. The depot cost is a summary cost which includes interim contractor support, airframe and engine overhaul, repair of component parts, modification installation, airframe inspection, and software support. Replenishment spares include the cost of replenishing the inventory of aircraft assemblies, spares, and repair parts that usually are repaired and returned to stock. System Support Mods includes Category IV Modifications, Ground Support Equipment, and base maintenance supplies.

Average annual cost per B-2 wing

Cost Element:	*Millions*
Personnel pay	$45.5
Personnel support	11.9
Personnel acquisition and training	13.1
Aviation POL	53.9
Replenishment spares	28.9
Depot maintenance	22.7
Systems support Mods	46.2
Training munitions	1.1
Total	223.3

Senator COHEN. Thank you, Mr. Chairman.

Senator EXON. Thank you, Senator Cohen.

Senator Thurmond.

Senator THURMOND. Thank you, Mr. Chairman.

Mr. Hinds, the flying wing concept has been around for over 40 years. It has always been discarded.

What makes the B-2 so different that it will not meet the same fate as its predecessors?

Mr. HINDS. Well, Mr. Senator, I think the basic thing that makes us different is the growth in computer augmented control systems. The original flying wings that we had, and even the flying wings that the Germans had in the 1930's, showed significant performance benefits. A big wing airplane has excellent range characteristics and excellent payload characteristics.

So the performance characteristics were always there. The problems that they had were the controlability of the airplane. They had started to make improvements in that when the B-49 program was shut down.

Of course, in 40 years of increasing technology, fly-by-wire systems have just come a long way, and they basically have made I think the flying qualities of this airplane a fairly low risk option.

We have put a lot of up-front development in this program. We've spent a lot of time in wind tunnels, a lot of time in simulators. We have done a lot of sensitivity analysis on how far off our estimates could be and how that would make the airplane react.

By and large, everything that we have done shows that we think this will be a very good performing, very easy airplane to fly, and will serve the country for a long time. It has a tremendous amount of flexibility. We think it is going to be a good airplane.

Senator THURMOND. Colonel Couch, I have been told that the B-2 could not fly without computer assistance.

I have also been told that we have had several crashes of the F-117 because of computer problems.

Are you familiar with that?

Colonel COUCH. No, sir. I am with the B-2 and the fly-by-wire flight control system with it, but not with the F-117.

Senator THURMOND. I am told there have been instances in commercial airliners where computer software problems have contributed to in-flight emergencies.

How much testing has been done on the computer system in the B-2, and what is the perception of your fellow pilots in having to rely on computers to keep an aircraft in the air?

Colonel COUCH. In addition to flying the B-2, I fly the F-16, and the F-16 relies on the same systems for staying airborne. It is a fly-by-wire flight control system in that airplane, and I have a lot of confidence in it. I have no reason to not be confident in the way the F-16 works.

In the B-2, we have done, in addition to the laboratories that I was discussing previously, we have a laboratory called the Flight Controls and Hydraulics Integration Lab, which is a full-scale model laboratory for all of the fly-by-wire flight control systems and the computers that support that. We have done hours and hours and hours of testing of the full-up system, and are satisfied that the system will work.

So I have all the confidence in the world that the computers that allow us to fly the airplane in fact will work. They are robust, and I see no reason not to have faith in that capability.

General WELCH. There have been no crashes of the F-117 due to flight control problems, sir.

Mr. HINDS. Mr. Senator, if I could add another comment to that, there are commercial airliners now that do use fly-by-wire systems. The A-320 has been certificated. So we are not the only airplanes that use fly-by-wire. Obviously, there is a great trust in those systems and in the dependability of those systems to enable the public, by and large, to fly on those.

Senator THURMOND. General, you said there have been no crashes of F-117's because of computer problems?

General WELCH. That is true. Yes, sir.

Senator THURMOND. General Chain, what if it turns out that Congress cannot buy the entire fleet of 132 aircraft? Can your command still fulfill its responsibilities within a smaller number of aircraft?

General CHAIN. The deterrent equation would change. The level of risk for the United States would increase. That decision, of what the remaining combat capability would be, I would bring forward to the Joint Chiefs. I would give them my best assessment.

I have not looked at lower numbers because we have already run through the formula, and the numbers that we have asked for are

the minimum numbers that I need to be able to carry out the task that I have been assigned.

Senator THURMOND. That is 132?

General CHAIN. Yes, sir.

Senator THURMOND. General Chain, assuming that production of the B-2 will continue but that the total number to be procured is reduced to less than 80, what will be the impact on the strategic triad and how can we compensate for the reduction in B-2s?

General CHAIN. I have not run out options. I have only focused on what number of B-2s do I need to be able to fill the bomber leg of the triad.

I am a strong believer that a viable triad ends up with a synergism that ends up being a force multiplier. We have not looked at lower numbers, so I don't have tradeoffs and what else might be able to be done.

As I tried to point out earlier during my presentation, the penetrating bomber has unique capabilities that can't be replaced by another weapon system.

Senator THURMOND. General Welch, if the Congress does not approve 132, just tell me frankly your opinion of the impact of that.

General WELCH. Well, of course, there are two impacts. One is the cost per airplane goes up, and that becomes even more of a perception problem. Second, the risk goes up.

Senator THURMOND. In other words, it would run the cost up per plane we purchase?

General WELCH. Certainly.

There is a very significant front-end development investment in this airplane, and if we don't amortize that investment over the planned number of airplanes, the cost per airplane goes up.

But the most important thing is that no one can tell you that 127 airplanes or 132 airplanes is acceptable or not acceptable. We can simply tell you that with fewer airplanes, the risk to the deterrent equation increases.

Senator THURMOND. I want to thank you, gentlemen.

Thank you, Mr. Chairman.

Senator EXON. Thank you very much, Senator Thurmond.

Senator Nunn.

Senator NUNN. Mr. Chairman, I don't want to duplicate what you have already done. Unfortunately, I have been interrupted all morning, starting at about 8 o'clock.

The only thing I want to ask is really one question, and it may have been covered.

I would like for you to give us a comparison, General Chain, between the conventional capability of the B-2 and the B-1.

General CHAIN. Both of them carry about the same internal bomb load. The penetration capability of the B-2 obviously is significantly better than the B-1. The range of the B-2, the unrefueled range of the B-2, is going to be in the 6,000 mile range. With air refueling, I would be able to take a B-2 and go 10,000 miles, with just one refueling. The attack profile, using the B-2 at night, delivering a conventional weapon, the probability of success there would be extremely high.

We could conduct the raid that was done in Libya, for instance, with two B-2s, with three tankers going from the United States all

the way to Libya and back to the United States, with only one refueling, to be able to execute that mission.

Senator NUNN. Is that round-trip?

General CHAIN. Yes, sir.

So, the B-2 will be a very important and valuable weapon system in a conventional environment.

The B-1, also because of its low altitude capability, small radar cross section, and high speed, will also be very valuable in a conventional situation.

Senator NUNN. On a scale of 1 to 10, 10 being the most capable, in a conventional role, where do you rate the B-1, the B-2 and the B-52. With 10 being the best, where do you put those three aircraft on the scale, in the conventional role?

General CHAIN. I'd put them at 1, 5, and 10; the B-52 at 1, using that as a standard of measurement. I think that the B-1 is significantly better than the B-52. And the B-2 is significantly better than both of them.

Senator NUNN. Now how about the same question for the strategic mission, for the nuclear mission. On a scale of 1 to 10, what is the B-1 and the B-2?

General CHAIN. In a highly defended area, the B-2 would be at a 10—if it is a highly defended area in the late 1990s. The B-1 and the B-52 would both be down at 1s and 2s, because they won't be able to penetrate into a highly defended area in the late 1990's.

Senator NUNN. That is even with the fixes that we are talking about on the B-1 now?

General CHAIN. The evolution is that today I have the B-52Hs in the SIOP. I have the B-1's in the SIOP. By 1997, all the B-52Hs will be out of the penetration role because of the Soviet defenses.

The B-1 today goes into highly defended areas. By 1997, the B-1 will not be able to go into highly defended areas and will have to go into lower defended areas, where the B-52H goes today.

And so, by the 1997 timeframe, I am going to have to have a penetrating bomber that can go into highly defended areas, and the only one that will be able to do that is the B-2.

Senator NUNN. Let me ask you one other question.

On the B-2, you hear a lot of talk about the mission. Some people say the mission is to simply rove around, after all the missiles have exchanged on both sides, and try to find something left. Others say that it is to find mobile targets.

How do you describe the strategic nuclear mission of the B-2, and let's again say in the late 1990s?

General CHAIN. We have a whole target set that has to be held at risk. Some of them can be held at risk with ICBMs, some with SLBMs, some with cruise missiles, and some with bomber only.

Most of the target set can he held at risk by more than one weapon system, and, consequently, we cross target, because a weapon, an ICBM, may or may not get there, an SLBM may or may not get there, an ALCM may or may not get there. So we end up cross-targeting. It may be an ICBM and an ALCM. It may be an SLBM and a bomber weapon. But we end up cross-targeting to make sure that we can hold at risk the target set.

The B-2, the penetrating bomber, is required against all of those target sets.

Now, there is one extra category that only can be struck by a penetrating bomber, and that is what we call relocatable targets, or mobile targets.

As you know today, they have the SS–24, the train-mounted ICBM. They have the SS–25, the road-mobile ICBM. They have aircraft that can move from base to base. They have submarines that may be in port. They have surface navies that may be in port or they may be out of port, and they have armies that may be in garrison or may have been moved out.

Those types of targets are called "mobile targets," and the only weapon system that I have today or will have tomorrow that can hold that set of targets at risk is the manned penetrating bomber, because you have to go in, see where it is, and then make the strike in real time.

Even with an overhead satellite system that beams back mobile target locations, by the time you can reprogram an ICBM or an SLBM or an ALCM, that mobile target probably won't be at the geographic coordinate, and the ICBM, SLBM, and ALCM, cannot be reprogrammed once they have been fired.

So the only weapon system that can hold those targets at risk is the penetrating bomber. But the penetrating bomber, if they had no mobile targets, it is still a requirement for the SIOP.

Senator NUNN. Thank you.

Mr. Chairman, thank you for having these hearings. I think they have served a very useful purpose and I commend you for taking that initiative.

Senator EXON. Thank you very much, Senator Nunn.

We are about ready to wind up.

Senator KENNEDY. Mr. Chairman.

Senator EXON. Yes?

Senator KENNEDY. May I ask one more, please?

Senator EXON. I was about to say, Senator, that we are about to wind up and I would be next.

But I would be happy to yield to Senator Kennedy at this time if he has any further questions, and then we will wind down.

Thank you for your patience, gentlemen.

Senator KENNEDY. Thank you, Mr. Chairman.

General, I was just trying to assess the risk that has been mentioned, here, the increasing risk to the United States, both without any B–2 program as well as with a full complement of B–2 bombers.

Earlier, in response to the question of Senator Thurmond, the question about a reduced force structure came up. I think you mentioned that there would be an increased risk, in terms of the United States.

I understand that by the year 2000, if we had 100 B–52s with 1,400 ALCMs, and 100 B–1 penetrators and 132 B–2s, that comes to approximately 5,000 warheads.

If you reduce the B–2s by half, say, you'd have 100 B–52s with 1,400 ALCMs, you'd have 100 B–1 penetrators, and 50 to 70 B–2s, and you'd have 1,000 instead of 2,000, and you would then come to about 4,000 warheads.

How much greater risk is there—we are talking about one leg of the triad—how much greater risk really is there to the U.S. securi-

ty between the 4,000, the second way, with the modified structure, and the 5,000 proposed structure?

How do you measure that?

General WELCH. I think there is a great danger of point-in-time analysis, Senator.

For example, the 100 B–52s that you mentioned would be more than 40 years old. So, at that point in time that you picked, no one could argue that a few B–2s would make the difference between whether or not you would be content or not content with the deterrent posture at that time.

But the point is that if you truncate the B–2 production, you have done so forever. The probability that we would truncate production and then restart it, of course, is so close to zero that it is not worth considering.

Those 40-year-old B–52Hs are going to go off the edge of the cliff sooner or later. We know they are.

Those B–1s that you suggested will become less and less capable of the penetrating role, and eventually they will be crowded out of that into a cruise missile role.

So, the 132 B–2s is far more than just the addition it makes to that group of airplanes at that point in time. They are the long-term future of the bomber leg of the U.S. triad.

Senator KENNEDY. Evaluate for me a little bit what would be the significance of, say, just half the force, 50 or 70 B–2s. Maybe the cost per unit would be higher, but what would be the difference in the fly-away costs?

General WELCH. The difference in the fly-away costs? I would have to get that number for you. But, clearly, there are about $27 billion or $28 billion worth of development costs that we are talking about, which would be amortized over half the number of airplanes. So the total program cost per aircraft would be a very significant increase.

What happens to the fly-away costs would depend more on the rate at which we buy them. But, clearly, if the cost is such a major issue today, although I don't believe it should be, if it is a fact that the cost is such a major issue today, reducing the expected buy would not only have a tremendous impact on the long-term future of the bomber leg, I think it would be tantamount to killing the program.

Senator KENNEDY. Why is that? Why, if you have half the force, unit costs go up—and I would appreciate the fly-away costs, if you would provide that in a way that can be discussed.

[The information follows:]

B–2

Flyaway cost includes engineering, tooling, manufacturing, quality control, engineering changes, government-furnished equipment, system test and evaluation, and warranties.

Reduced procurement quantities would result in higher flyaway costs because production and overhead costs are spread out over fewer aircraft. Current projected flyaway cost for the 132 aircraft program in then-year dollars is $315M per aircraft. If the program was reduced to 64 aircraft, the flyaway cost would increase to $385M, while the cost for a 44 aircraft buy would be $455M per aircraft.

Senator KENNEDY. If you had half of that, why aren't you still then able to overcome Soviet anti-aircraft capability? Why doesn't that give you the basic penetration that is sufficient?

We are basically talking about the security and where we are going to get the greatest bang for the buck in terms of our defense dollars.

You would have the capability. You'd have the Stealth technology. You would have half the fleet able to penetrate. And, given the combination of the B-1s and other capabilities, how much additional risk are we really assuming?

You see, I think it is difficult because we think now that we are relying on the B-52, somewhat on the B-1s, and we have security today. We have security today. Then, when we ask and say well, in 10 years, if we have half the numbers of B-2s, B-52s are going down and we'll still have the B-1s, but we don't have security effectively.

I am just trying to think that through, why that is. What is the additional component that brings either you or the American people, that should bring the American people to that conclusion?

General WELCH. Clearly you are increasing risk in the one area where the results of an inadequate force is totally disastrous.

I don't know how to answer that question.

I don't know how to answer the question of what does it do to deterrence if you cut half the carrier force.

Senator KENNEDY. If I could stop you there, that is exactly it.

Why do we have security with 15 carriers and not with 12? Or with 13?

General WELCH. Why do you have security with 35 tactical fighter wings and not with 28?

Senator KENNEDY. Yes, pretty good.

General WELCH. The fact is you have lower security and you have higher risk. You have to make the choice of how much risk you are willing to accept. I cannot quantify that for you.

Senator KENNEDY. Well, the carrier example is pretty good. You had three Secretaries of Defense who thought 12 were enough. The Navy wanted 21. We have 15 today. Do we have security?

What is the magic about these numbers? It would certainly seem that we have security today with a different number.

Are we talking about the same kind of circumstance here as we were with the aircraft carriers, where you have a lesser number and you are still able to provide security in terms of the country's interest, because you do have the Stealth technology, you still have the Stealth capability, you still have the penetration. But, instead of 132, maybe you have 50 or 70.

That is what I am trying to get some feel for.

General WELCH. I think I would have two comments on that.

One is I would repeat that the risk goes up. I cannot quantify it for you. Second, it is not a decision that we face in the near-term. We will deliver the 79th airplane and the 76th airplane several years down the road. So I don't know how to address it for you, nor do I know why I would need to today.

General CHAIN. Let me make a comment, if I may, Senator.

Senator KENNEDY. Yes.

General CHAIN. As a targeteer, if we cut down the B–2 by 50 aircraft, you are talking about 1,000 weapons. To be able to endorse the START Treaty at the 6,000 level accountable weapons, the strength of that treaty is the value of the manned penetrating bomber weapon because only the aircraft counts.

We have 20 weapons, generically, internal to that bomber.

I can tell you, as the person who has to target, that 1,000 weapons are critically important to me. We are talking 15 percent of the total weapons that I would have available to me to be able to flesh out the SIOP.

Senator KENNEDY. Well, the President talked about 6,000, General. He didn't talk about 6,000-plus or 6,000 with these particular numbers. He just talked about 6,000.

And if you reduce in terms of the START, if you go with no B–52s, with 4,900 BM warheads, 1,000 cruise missiles, and 100 bombers, you are talking about 6,000 weapons—actually, 7,000. If you take half the B–52s, you are talking about 8,000. And if you take 230 bombers, you are talking about 9,000.

I am not one to accept the fact that you have, with the President talking about 6,000 warheads and you take half the number of B–2s, and you are down to 8,000, why if you have 9,000 it's fine, and 8,000 does not do the job. I just have trouble buying that.

General CHAIN. It's because you start with a target set. I went through it and I would be happy to sit down with you and go through the whole briefing.

Senator KENNEDY. I've had the briefing, General.

I think the idea is that the President talks about 6,000. If we are to have half the number of B–2s, you've reduced the total number from 9,000 to 8,000. And to suggest that it is going to undermine START I think is a real disservice. I believe that very deeply.

And to try to suggest to the American people that unless you are going to get these B–2s we're not going to have a successful negotiation makes absolutely no sense whatsoever. I think it insults the intelligence both of the Congress and the American people.

How you're going to be able to say that with 9,000, you are going to have a successful negotiation, and if you have half the number of B–2 bombers, you'll only have 8,000, and they're going to fall apart—I think the argument falls on its face.

General CHAIN. I obviously disagree with you.

When the military sat down to weigh the factors associated with the proposed START agreement, the military concluded that tentatively we could agree with a proposed START agreement because of the strategic modernization program. It was all predicated, complete support was predicated, on the competition of the strategic modernization program which has been supported by the Congress for 10 years.

So, when you come in here and now tell me to reverse the course and say well, we're just going to take 1,000 weapons away from you and why can't you continue to agree, it's because our analysis, our whole run-out of looking at the START agreement was with a completed modernization program against the target base that we will be faced with at the time such a treaty will come into existence.

Senator KENNEDY. Well, the President then should have said 9,000—is that right—and leveling with the American people? It's 9,000—that's what the President should have said.

General CHAIN. The President has known throughout, all Presidents have known throughout, President Reagan, President Bush have known throughout what the position of the START talks have been, and they have been, from the beginning, to include the manned penetrating bomber.

Senator KENNEDY. That is with 9,000, instead of 6,000. The President then should really be talking about 9,000 as the START position, instead of the 6,000.

Is that correct?

General CHAIN. That sounds fine to me, because the 6,000 are accountable weapons and there is a whole group of weapons that are not accountable in the START numbers that have been agreed upon by President Reagan and Secretary Gorbachev at Reykjavik.

Senator KENNEDY. Well, General, I have been a supporter of the B-2 since the 1970s—I was opposed to the B-1—because I did think that it has a very substantial jump in terms of technology. I think all of us who supported it back in the past are appalled by the increasing costs. I think that is one of the best kept secrets of Washington.

There is going to be some adjustment in terms of the program. I think most people understand that.

My own sense is that we ought to be giving a good deal of attention not to the halting of the program, because there has been major progress. I think you make a strong case. I think it is important that there be a program, a B-2 program.

But I think it is completely responsible to look back and to try to review why 132 bombers is the magic number and whether we cannot achieve both the mission of the B-2 bomber with somewhat less.

That is something, Mr. Chairman, that I want to have the opportunity to pursue at another time.

I want to thank you very much, Mr. Chairman, and thank the Generals very much for their responses to the questions.

Senator EXON. Thank you very much, Senator Kennedy.

I guess, or at least I thought what the President was referring to is what you said, General Chain, in your response. I think the President is making the case for 6,000 accountable weapons. I think that is what he is referring to.

Therefore, we get into the complicated matter of accountable, against actual, weapons.

I did not believe that the President was trying to mislead anyone. But I come back to the central point here, which is that I think we all have to agree, or we all should agree, that the present START numbers, under the present START scenario, mandate the B-2 bomber.

We can argue about numbers. I suspect—although I would give you a chance, General Welch or General Chain, to answer—I would suspect that, while we could argue about whether we need, 50, 132, or 232, you, in the Air Force, have given us your best estimate of the position that you would be in under START, and that is how you came up with 132.

I think it is nice to debate this, but I would suggest that the total number of buys that we will finally make on the B–2 is going to be decided in future years by the President and the Congress. I don't know that we need to go into a deep discussion about that now.

Would you explain a little bit more about the accountable warheads? Isn't that what the President was referring to?

General WELCH. In the first place, I think we ought to put into context that the Air Force is given a task to do, and that came to 132 bombers. If someone redefines that task, then it would come to some other number.

We are certainly not in a position to argue whether or not the task is right or not. I agree with the task, but it is not my task. I did not determine the task.

But that is the relationship of the 132 bombers. I certainly cannot quantify what the difference would be, and I don't think anyone can.

From the beginning, we have recognized and have tried to correct on several occasions this tendency to the short-hand discussion of the 6,000 warheads. It has always been 6,000 ballistic missile and ALCM warheads.

Those rules were clearly stated at Reykjavik. Those rules were clearly understood by all the people involved in the arms control negotiations.

But, as I said earlier, I agree that the short-hand of only talking about 6,000 leads to troublesome conclusions at a later date. That is why we have tried to correct that several times, but we never got it to stick.

Senator EXON. General, thank you very much.

My last two questions have to do with "The Advanced Technology Bomber: A Revolution in Deterrence," which I reference at this time.

[Publication referred to is retained in the committee file.]

Senator EXON. Both my last concluding questions would be in this regard.

Senator Nunn got into the conventional role of the B–2 and we got into a discussion on Libya. That is discussed in this particular document.

Here it says that we could have done the same job on the mission in Libya with four aircraft of the B–2 variety. I would just like to cite the figures, that had we had the B–2 at that time, we could have carried this out with two or four of the B–2s. That would have put a total of four aircraft at risk, rather than the total of 84 that we had assembled for that mission.

That would have required 35 support aircraft, or did require 34 aircraft to support those 84. With the B–2, it would have been five.

Air crew at risk were 134 with that mission. Air crew at risk would be a maximum of eight with the B–2. And the time required to plan and execute that mission was 5 days, and it could be done with the B–2 in a matter of hours.

Now, there was a reference to this I think in the House the other day that I read about. Some Member over there scoffed at the idea of using a $500 million airplane to blow up a $1,000 or $2,000 bridge.

I suggest that that is begging the question.

If it is determined by our military leaders and the President that we have to take out a $1,000 bridge, then I would suspect in the future we would want to carry out that mission as expeditiously and at the least risk to manpower and womanpower and airplanes as would be necessary.

Therefore, I just want to emphasize, once again, that the B-2 has a very convincing, in my view, conventional role to play that probably is not generally understood or appreciated.

I refer to another page of this particular brochure where we show the air defense capability of the Soviet Union as against our current aircraft. Then, under the Northrop chart that I understand was provided and approved by the Air Force as printed, it shows how the B-2s could come in. You could see that it would be almost impossible, according to these charts, for them even accidentally to run into anything that could detect them.

Now I reference "The B-2 In Perspective," which is an Air Force publication.

[Publication referred to is retained in the committee file.]

Senator EXON. It would look to me like on this chart (indicating), that there is practically no risk. On this chart (indicating), although it just may be dimensions, it looks like it would be not as easy as this chart (indicating) seemed to indicate.

Do you agree that, from this standpoint, these charts are a little bit misleading? If so, which is accurate, or is it somewhere in between?

General WELCH. Clearly, if you read the words that go with that book in your right hand, which is an Air Force publication, we have pointed out that in order to give a more complete perspective, we are dealing with some pretty sensitive information in an unclassified manner. So everything you see in there when we talk about defenses is notional.

The point that is indisputable, however, and that the brochures in each hand agree on, is that the B-2 can penetrate those defenses virtually unchallenged.

Now, as to the actual difference in the range that a radar sees a B-1 and a B-2, that is very, very sensitive. Neither one of those depictions is accurate from that viewpoint, nor should they be.

What is accurate is that the B-2 can penetrate those defenses virtually unchallenged because of the very limited range of those radars against the Stealth bomber.

Let me be sure in the case of the Libyan raid that we do not allow that to get out of context.

It is true that a small handful of B-2s could carry that payload. But that does not make it true that we would have elected to use the B-2 for that particular mission.

The point of that illustration was to answer the charge that you would never use an airplane as expensive as the B-2 for a conventional mission.

A carrier task force costs about $15 billion. We used two carrier task forces and an awful lot of Air Force airplanes.

Clearly, clearly we are willing to commit those kinds of resources to those kinds of tasks. But I hasten to point out that I have never said, nor would I ever say, that we would have used a B-2 for that specific mission, for that specific purpose.

Clearly, there are any number of missions where you would use a B–2, and cost would not be a deterrent factor because the risk is so low when you use a B–2 for that sort of mission.

Senator EXON. Thank you, gentlemen, very much.

There may be some additional questions for the record—I hope not too many—but I would suggest that there might be. If you can respond to those—if they are provided as quickly as possible—we would appreciate it.

General Welch, General Chain, Mr. Hinds, Colonel Couch, you have been very patient and very helpful this morning. We appreciate the fact that you came before the committee and to the breakfast this morning.

We are adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

B–2

Senator EXON. First, on the issue of longitudinal stability, the Senator says that in 1984 the Air Force and Northrop claimed that, based on their wind tunnel and computer testing, everything was fine, but that, in 1986, the Air Force had to add the two vee-shaped wedges at the back of the airplane for control purposes, and that cost $2 billion and a lot of delay. Is that correct? If so, why were all the wind-tunnel tests in error?

General WELCH. The B–2 is inherently longitudinally stable because, like an arrow, the center of lift is behind the center of gravity. The planform redesign was required, not for stability enhancement, but due to the addition of the low altitude, high speed mission. Due to gusts, this mission imposed more severe loading conditions. The aircraft redesign accomplished two things: (1) it allowed for an internal structural arrangement which more evenly distributed the loads across the aircraft and (2) it added additional flight control surfaces to aid in active gust load alleviation and added flight control authority.

Senator EXON. Second, Senator Glenn argued to us that the reason you are likely to have stability problems is because you originally had two canted vertical tails on the B–2, but you couldn't make the Stealth work with those vertical surfaces on it and so you took them off during the development. Is that correct? Does the B–2 need vertical surfaces to fly right? If so, why did you take them off?

General WELCH. One of the earliest potential designs in 1979 had two vertical tails. However, over several iterations of design changes, these were removed in favor of drag rudders before the design was frozen in 1980. The drag rudders provide the required stability.

Senator EXON. Third, Senator Glenn argued that another reason why you had to redesign the back end of the B–2—the $2B fix—is because your fly-by-wire system was found to be subject of what he calls "porpoising," which, as he described it is sort of like this (wiggle hand up and down). Did you have to revise the fly-by-wire system and modify the back edge of the airplane to prevent this?

General WELCH. The fly-by-wire flight control system enhances rather than limits the B–2s stability and control. The planform redesign was driven by the low-altitude, high-speed mission requirements. The aircraft redesign accomplished two things: it allowed for an internal structural arrangement which more evenly distributed the loads across the aircraft, and it added additional flight control surfaces to aid in active gust load alleviation and added flight control authority.

Senator EXON. Fourth, Senator Glenn described something he called "adverse yaw" as a real problem, and he also claimed that you cannot meet the desired roll rate on the B–2. Can you explain these problems to us, and tell us how serious they are?

General WELCH. The B–2, like other aircraft, generates adverse yaw during a roll maneuver. This characteristic is fully compensated for by the B–2's fly-by-wire flight control system. The results from the first flight indicate that the roll rate performance was, in fact, better than predicted values.

Senator EXON. Senator Glenn claimed that he had been told by the Air Force or someone that the B–2 would not be tested during the block 1 flight tests—the first 14 flights—at more than a one-G loading. Information that our staff got from the

Air Force says it will be tested at up to two Gs? Are you testing at one-G or at two-Gs? And have you changed this at any point in planning the flight tests?

General WELCH. During the initial flight testing of the B-2, flight testing is planned to include maneuvers up to 2.0 Gs at gross weights below 225,000 lb and up to 1.6 Gs at gross weights above that value. This does not represent a change.

[Whereupon, at 12:36 p.m., the committee adjourned, to reconvene upon the call of the Chair.]

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